THE NEXT GEN EDITION

PHYSICAL THERAPY

BOARD REVIEW & MOCK EXAMINATION

Next-Generation PT Board Review & Clinical Test Bank

- **300+** QUESTIONS PER SECTION
- **COMPLETE** ANSWER KEY
- **FULL** RATIONALE
- **5 BOARD EXAM** SECTIONS
- **CLINICAL & THEORETICAL** EXPLANATIONS

FOR RPT LICENSURE EXAMINATION CANDIDATES

PHILIPPINE PHYSICAL THERAPY BOARD EXAM PREPARATION

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Philippine Physical Therapy Board Exam Preparation

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ABOUT THIS REVIEWER

How to Use This Book

This comprehensive Physical Therapy Board Review is designed for Filipino RPT licensure examination candidates preparing for the 2026 and 2027 PRC board examinations. The questions, answers, and explanations in this volume are built around core concepts that have appeared in the 2023, 2024, and 2025 PRC Philippine Board Examinations.

Structure of This Book

This reviewer is organized into five sections that mirror the PRC Board Examination structure:

- Section S1: Basic Sciences — Anatomy, Physiology, Kinesiology, and Pathology
- Section S2: Clinical Sciences I — Musculoskeletal Physical Therapy
- Section S3: Clinical Sciences II — Neurological Physical Therapy
- Section S4: PT Procedures, Modalities, and Electrotherapy
- Section S5: Professional Practice, Ethics, Jurisprudence, and Administration

How Each Question Is Structured

Every question in this reviewer includes:

1. The Question — written to reflect the style, depth, and focus areas of PRC board exam questions.

2. Four Answer Choices (A–D) — the correct answer is highlighted in green with a checkmark (✓).

3. A Rationale & Explanation — written in a conversational, human tone to help you understand WHY the answer is correct, not just what the answer is. The goal is to create a memorable learning experience, not just a memorization drill.

Study Strategy Recommendations

• Read the question stem carefully. Identify keywords like 'MOST common,' 'FIRST,' 'PRIMARY,' 'CONTRAINDICATED,' or 'EXCEPT.' These words completely change the correct answer.

• Cover the choices and try to answer from memory first. Then check the options.

• Read the rationale even when you get the answer right — the explanation often contains additional pearl-level information tested in subsequent questions.

• Focus on RED FLAG conditions (DVT, compartment syndrome, septic arthritis, autonomic dysreflexia, spinal cord injury emergencies) — these appear on every board exam cycle.

• Know your outcome measures: which scale measures what, what the scores mean, and how to interpret clinically meaningful change (MCID).

• For Philippine-specific content: know RA 10210, PRC requirements, CPE units, and PT scope of practice thoroughly.

A Note on Currency of Information

All PT concepts in this reviewer are based on the most current and widely accepted evidence available as of 2025. Where guidelines have been updated (e.g., ACSM exercise guidelines, blood pressure classification, ACL

rehabilitation criteria), the updated standards are reflected. For the PRC board examination, always defer to the most recently adopted guidelines and the current Philippine PT laws (RA 10210 and related PRC administrative orders).

S1
Basic Sciences
Anatomy, Physiology, Kinesiology & Pathology

ANATOMY

1. Which muscle is the PRIMARY hip flexor tested by resisted hip flexion at 90°?

A. Gluteus maximus

B. Iliopsoas

C. Rectus femoris

D. Tensor fasciae latae

✓ Answer: B

💡 Rationale & Explanation:

Think of the iliopsoas as the hip's 'engine.' Made of the iliacus and psoas major, they are the strongest hip flexors in the body. When testing resisted hip flexion at 90° in a seated MMT position, you're zeroing in on the iliopsoas. The rectus femoris also flexes the hip but doubles as a knee extensor, so it doesn't fully commit to hip flexion alone. The gluteus maximus is a hip extensor (opposite action), and the TFL assists but isn't primary. Memory trick: 'Ilio-PSOAS = POWER flexor.'

---

2. The brachial plexus root value for the axillary nerve is:

A. C5-C6

B. C6-C7

C. C7-C8

D. C8-T1

✓ **Answer: A**

💡 **Rationale & Explanation:**

The axillary nerve comes from C5-C6 — same roots as the musculocutaneous nerve. An easy way to remember: C5-C6 = shoulder area nerves. The axillary nerve wraps around the surgical neck of the humerus (why it gets injured in shoulder dislocations or proximal humerus fractures) and innervates the deltoid and teres minor. If your patient has a deltoid palsy and can't abduct the shoulder after a shoulder dislocation, think axillary nerve — C5-C6 lesion.

---

3. **The 'unhappy triad' of the knee involves which three structures?**

A. ACL, PCL, medial meniscus

B. ACL, MCL, medial meniscus

C. ACL, LCL, lateral meniscus

D. PCL, MCL, lateral meniscus

✓ **Answer: B**

💡 **Rationale & Explanation:**

The 'unhappy triad' (O'Donoghue triad) involves the ACL, MCL, and medial meniscus. It classically happens in football — a valgus force with external rotation tears all three at once. Why the medial meniscus? Because the medial meniscus is attached to the MCL, so when the MCL goes, it often takes the meniscus with it. The lateral meniscus is more mobile and less attached, so it's less commonly injured in this pattern. Boards love this classic triad.

---

4. **Which nerve is responsible for wrist drop following a mid-shaft humeral fracture?**

A. Median nerve

B. Ulnar nerve

C. Radial nerve

D. Musculocutaneous nerve

✓ **Answer: C**

💡 **Rationale & Explanation:**

Radial nerve = wrist extension. The radial nerve runs in the spiral groove of the humerus, and a midshaft fracture is the #1 cause of radial nerve injury. The result is wrist drop — the extensor carpi radialis and extensor carpi ulnaris are paralyzed. Memory aid: 'Radial = wRist extension.' Wrist drop + humeral fracture = radial nerve, every time.

---

5. The rotator cuff muscle that is MOST commonly torn is the:

A. Infraspinatus

B. Subscapularis

C. Teres minor

D. Supraspinatus

✓ **Answer: D**

💡 **Rationale & Explanation:**

The supraspinatus accounts for 95%+ of rotator cuff tears. It passes through the subacromial space where it gets squeezed between the humeral head and the acromion with every overhead motion. Over time, friction causes microtears and eventually full-thickness tears. It's the muscle you test with the 'empty can' (Jobe's test). Remember: Supra = Superior = most commonly torn.

---

6. Which carpal bone is MOST frequently fractured and can lead to avascular necrosis due to its blood supply entering distally?

A. Lunate

B. Trapezium

C. Scaphoid

D. Pisiform

✓ **Answer: C**

💡 **Rationale & Explanation:**

The scaphoid is the most commonly fractured carpal bone (typically from a FOOSH injury). The blood supply enters from the distal end, so a fracture in the waist cuts off circulation to the proximal pole, leading

to avascular necrosis. Clinically: anatomical snuffbox tenderness after a fall = suspected scaphoid fracture. X-rays may be NEGATIVE early. MRI is the gold standard for early detection.

---

7. The primary action of the serratus anterior muscle is:

A. Shoulder internal rotation

B. Scapular retraction

C. Scapular upward rotation and protraction

D. Scapular elevation

✓ Answer: C

💡 **Rationale & Explanation:**

Serratus anterior holds the scapula against the thorax (preventing winging) AND upwardly rotates the scapula so you can raise your arm overhead. Its nerve is the long thoracic nerve (C5-C6-C7). When this nerve is injured (e.g., during axillary node dissection in mastectomy), you get 'winged scapula.' Test it by having the patient do a wall push-up; if the scapula wings, serratus anterior is weak.

---

8. The dermatomal level for sensation over the nipple line is:

A. T2

B. T4

C. T6

D. T10

✓ Answer: B

💡 **Rationale & Explanation:**

T4 = nipple line. This is a high-yield dermatome. The full chest dermatome cheat sheet: T4 = nipples, T6 = xiphoid process, T10 = umbilicus (belly button), T12 = inguinal ligament area. Going from T4 to T10 is moving from nipples to the belly button. In spinal cord injury or epidural placement, knowing these levels helps determine motor/sensory preservation.

---

9. In carpal tunnel syndrome, which nerve is compressed and at what location?

A. Ulnar nerve at Guyon's canal

B. Median nerve at the carpal tunnel

C. Radial nerve at the wrist

D. Median nerve at the elbow

✓ Answer: B

💡 **Rationale & Explanation:**

Carpal tunnel syndrome (CTS) = median nerve compression under the transverse carpal ligament. The median nerve provides sensation to the thumb, index, middle, and radial half of the ring finger. Patients get tingling/numbness in those exact fingers — often shaking their hands awake at night (the 'flick sign'). Thenar muscle weakness and atrophy occur in severe cases. Don't confuse with ulnar nerve entrapment at Guyon's canal (4th and 5th fingers). Phalen's and Tinel's signs are your clinical tests.

---

10. Which ligament prevents anterior translation of the tibia on the femur?

A. Posterior cruciate ligament (PCL)

B. Medial collateral ligament (MCL)

C. Anterior cruciate ligament (ACL)

D. Patellar ligament

✓ Answer: C

💡 **Rationale & Explanation:**

The ACL prevents the tibia from sliding forward (anteriorly) on the femur. The PCL does the opposite: prevents the tibia from sliding backward. Memory trick: 'ACL = Anterior.' Clinical tests: Anterior drawer test and Lachman test for ACL, Posterior drawer test for PCL. In a positive Lachman test, the tibia shifts forward with no firm endpoint — that's ACL disruption. The Lachman test is more sensitive than the anterior drawer test because it's done at 30° flexion.

---

11. The femoral triangle boundaries include all of the following EXCEPT:

A. Inguinal ligament (superior)

B. Sartorius (lateral)

C. Adductor longus (medial)

D. Rectus femoris (floor)

✓ Answer: D

💡 **Rationale & Explanation:**

The femoral triangle: inguinal ligament (roof/superior), sartorius (lateral border), adductor longus (medial border). The FLOOR is made up of iliopsoas and pectineus — NOT the rectus femoris. The contents, lateral to medial: NAVEL — Nerve, Artery, Vein, Empty space (lymphatics). This is a classic anatomy question — know your triangle contents and arrangement!

---

12. The primary spinal cord level for the patellar (knee jerk) reflex is:

A. L2-L3

B. L3-L4

C. L4-L5

D. L5-S1

✓ Answer: B

💡 **Rationale & Explanation:**

The patellar reflex (knee jerk) is mediated by L3-L4 — primarily L4. Think of it as the quadriceps reflex. If a patient has a diminished patellar reflex, think L4 nerve root compression (like an L3-4 disc herniation). The Achilles reflex (ankle jerk) = S1. The biceps reflex = C5-C6. The triceps reflex = C6-C7. These reflex levels are MUST-KNOW for the PRC PT boards.

---

13. Which structure passes through the greater sciatic foramen BELOW the piriformis?

A. Superior gluteal nerve

B. Sciatic nerve

C. Obturator nerve

D. Femoral nerve

✓ **Answer: B**

💡 **Rationale & Explanation:**

The greater sciatic foramen is divided by the piriformis into above and below. ABOVE the piriformis: superior gluteal nerve and artery. BELOW the piriformis: sciatic nerve, inferior gluteal nerve, pudendal nerve, nerve to quadratus femoris, posterior femoral cutaneous nerve. Memory: 'Pirates go BELOW.' In piriformis syndrome, the sciatic nerve gets irritated as it passes below or through the piriformis, causing buttock pain that mimics disc herniation.

---

14. The 'carrying angle' of the elbow is formed between the humerus and the:

A. Radius

B. Ulna

C. Both radius and ulna

D. Olecranon

✓ **Answer: B**

💡 **Rationale & Explanation:**

The carrying angle is the angle between the humerus and the ULNA in anatomical position. Normal values: 5-10° in males, 10-15° in females. An increased carrying angle is cubitus valgus; decreased is cubitus varus ('gunstock deformity'). This angle is commonly tested in the context of supracondylar fractures in children — a malunited fracture causes cubitus varus. The radius doesn't define this angle.

---

15. Which cervical vertebra is called the 'axis' and has the odontoid process (dens)?

A. C1

B. C2

C. C3

D. C4

✓ **Answer: B**

💡 **Rationale & Explanation:**

C2 = Axis, with its signature dens (odontoid process). The dens is a bony peg that sticks up from C2 and acts as a pivot around which C1 (the atlas) rotates — where 'no-no' turning of the neck occurs. C1 = Atlas. A fracture of the dens is serious because displaced fragments can compress the spinal cord. The transverse ligament of C1 holds the dens; rupture (as in rheumatoid arthritis) causes atlantoaxial instability — a major PT red flag!

---

16. The muscle primarily responsible for inversion of the foot is the:

A. Fibularis (peroneus) longus

B. Extensor digitorum longus

C. Tibialis anterior

D. Gastrocnemius

✓ **Answer: C**

💡 **Rationale & Explanation:**

Tibialis anterior is the primary foot invertor AND the strongest dorsiflexor. It runs along the anterior shin and inserts at the medial cuneiform and base of the 1st metatarsal. When it contracts, it dorsiflexes AND inverts the foot. During gait, it controls foot drop during the swing phase. The fibularis (peroneus) longus and brevis are the EVERTORS — don't mix them up with invertors. On the PRC board, 'primary invertor' = tibialis anterior.

---

17. The intervertebral disc is composed of which two main structures?

A. Nucleus pulposus and anulus fibrosus

B. Hyaline cartilage and fibrocartilage

C. Nucleus pulposus and vertebral endplate

D. Anulus fibrosus and anterior longitudinal ligament

✓ **Answer: A**

💡 **Rationale & Explanation:**

The intervertebral disc has two layers: the nucleus pulposus (inner, gelatinous core — like jelly in a doughnut) and the annulus fibrosus

(outer fibrous ring — the doughnut part). The nucleus is mostly water and proteoglycans; it distributes compressive loads. Disc herniation occurs when the nucleus breaks through the annulus. The most common direction is posterolateral (because the posterior longitudinal ligament is thin there) — compressing the nerve root in the foramen.

---

18. Which describes the close-packed position of the glenohumeral joint?

A. Arm at rest (0° abduction)

B. 90° flexion, neutral rotation

C. Full abduction with external rotation

D. 90° abduction, neutral rotation

✓ Answer: C

💡 **Rationale & Explanation:**

The close-packed position = maximum congruency and MINIMUM capsular laxity — the joint is most stable and 'locked.' For the glenohumeral joint: full abduction with external rotation. In this position, the capsule and ligaments are maximally taut. The loose-packed (resting) position is ~55° abduction with 30° horizontal adduction — where the capsule is most relaxed, used for joint mobilizations.

---

19. The lateral collateral ligament (LCL) of the knee attaches from the lateral femoral epicondyle to:

A. Medial tibial plateau

B. Fibular head

C. Lateral tibial plateau

D. Femoral condyle

✓ Answer: B

💡 **Rationale & Explanation:**

The LCL runs from the lateral femoral epicondyle to the FIBULAR HEAD — not the tibia. This is a key difference from the MCL, which attaches to the medial tibial flare. The LCL resists varus stress. LCL injuries are less common than MCL injuries in sports because valgus mechanisms

are more common. A combined LCL/posterolateral corner injury is among the most severe knee ligament injury patterns.

---

20. The thoracolumbar fascia key muscles attaching to it are:

A. Rectus abdominis and quadratus lumborum

B. Latissimus dorsi and gluteus maximus

C. External oblique and iliopsoas

D. Erector spinae only

✓ Answer: B

💡 **Rationale & Explanation:**

The thoracolumbar fascia (TLF) is a massive connective tissue structure in the back acting like a corset. The key muscles attaching to it are the latissimus dorsi and gluteus maximus — forming a diagonal force couple. When you walk, these muscles load the TLF diagonally, creating a natural stabilizing 'X' pattern across the back. This is why treating low back pain often involves the glutes and lats, and relates to Vleeming's force closure concept.

├— PHYSIOLOGY

21. Cardiac output is calculated as:

A. Heart rate × Blood pressure

B. Heart rate × Stroke volume

C. Stroke volume / Heart rate

D. Blood pressure / Peripheral resistance

✓ Answer: B

💡 **Rationale & Explanation:**

Cardiac Output (CO) = Heart Rate (HR) × Stroke Volume (SV). Normal CO at rest is about 4-6 L/min. If your HR is 70 bpm and SV is 70 mL, CO = 4,900 mL/min ≈ 5 L/min. During exercise, CO can increase to 20-25 L/min in untrained individuals and up to 40 L/min in elite athletes. In

heart failure, either HR or SV (or both) drop, reducing CO. Physical therapy aerobic exercise training aims to improve stroke volume over time through cardiac remodeling — making each heartbeat more efficient.

---

22. Normal arterial oxygen saturation (SpO2) in a healthy adult is:

A. 85-90%

B. 90-93%

C. 95-100%

D. 80-85%

✓ Answer: C

💡 **Rationale & Explanation:**

Normal SpO2 = 95-100%. Below 90% is considered hypoxic and usually requires supplemental oxygen. In physical therapy, if a patient's SpO2 drops below 90% during exercise, STOP the activity and allow recovery. Some COPD patients may have baseline SpO2 of 88-92% — always know the patient's baseline. Carbon monoxide poisoning gives a falsely HIGH reading because CO binds hemoglobin like O2 does.

---

23. During the muscle stretch reflex, which receptor detects change in muscle length?

A. Golgi tendon organ

B. Ruffini endings

C. Muscle spindle (Ia afferents)

D. Pacinian corpuscles

✓ Answer: C

💡 **Rationale & Explanation:**

Muscle spindles detect changes in MUSCLE LENGTH and the RATE of length change. The Ia afferent fibers travel to the spinal cord and synapse directly on alpha motor neurons (monosynaptic reflex arc). When you tap the patellar tendon, the quadriceps stretch fires the spindles, Ia fibers signal, and the quads contract — classic stretch

reflex. The Golgi tendon organ (GTO) detects TENSION — it's the inverse stretch reflex (relaxes the muscle when tension is too high).

---

24. Which type of muscle fiber has HIGH fatigue resistance and is used during sustained, low-intensity activities like walking?

A. Type IIx (fast-twitch glycolytic)

B. Type IIa (fast-twitch oxidative)

C. Type I (slow-twitch oxidative)

D. Type IIb

✓ Answer: C

💡 **Rationale & Explanation:**

Type I (slow-twitch) fibers are your endurance fibers. They're loaded with mitochondria and myoglobin (which gives them their red color), rely on aerobic/oxidative metabolism, and are highly fatigue-resistant. They're recruited first for low-intensity, sustained activities like walking, posture maintenance, and marathon running. Type II fibers (fast-twitch) are for power and speed but fatigue quickly. PT endurance training increases mitochondrial density in Type I fibers and promotes IIx to IIa shifts.

---

25. Normal blood pressure in adults according to updated guidelines is:

A. Systolic <130 mmHg and diastolic <80 mmHg

B. Systolic <120 mmHg and diastolic <80 mmHg

C. Systolic <140 mmHg and diastolic <90 mmHg

D. Systolic <110 mmHg and diastolic <70 mmHg

✓ Answer: B

💡 **Rationale & Explanation:**

Normal BP = <120 mmHg systolic AND <80 mmHg diastolic. Elevated BP: 120-129/<80. Stage 1 HTN: 130-139 or 80-89. Stage 2 HTN: ≥140 or ≥90. Hypertensive crisis: >180/120. In PT, exercise is contraindicated if resting systolic BP >180 or diastolic >110. During exercise, systolic BP normally RISES while diastolic remains stable. A DROP in systolic BP

during exercise is a red flag (exertional hypotension) — suggests cardiac compromise.

---

26. The physiological response to increased CO2 levels (hypercapnia) is:

A. Decreased respiratory rate

B. Cerebral vasoconstriction

C. Increased respiratory rate and depth

D. Decreased heart rate

✓ Answer: C

💡 **Rationale & Explanation:**

CO2 is the primary driver of breathing in healthy individuals. When CO2 rises, it diffuses into the cerebrospinal fluid, lowers the pH, and stimulates central chemoreceptors in the medulla — triggering increased respiratory rate and depth. In COPD patients with chronic CO2 retention, the central chemoreceptors become desensitized to CO2. These patients rely on HYPOXIC DRIVE (low O2). This is why giving high-flow O2 to a COPD patient can suppress their breathing drive — give controlled O2 instead.

---

27. During an action potential, what event causes REPOLARIZATION?

A. Rapid Na+ influx

B. Rapid K+ efflux

C. Cl- influx

D. Ca2+ influx

✓ Answer: B

💡 **Rationale & Explanation:**

Depolarization is caused by rapid Na+ influx (sodium rushes IN). Repolarization — the return to negative resting potential — is caused by rapid K+ EFFLUX (potassium rushes OUT). The sequence: 1) Stimulus → Na+ channels open → Na+ rushes in → cell becomes positive. 2) Na+ channels inactivate → K+ channels open → K+ rushes out → cell returns negative. 3) Brief hyperpolarization. The Na+/K+ pump then

slowly restores the original ion distribution. This sequence takes only 1-2 milliseconds per action potential.

---

28. The rate pressure product (RPP), used to estimate myocardial oxygen demand, is calculated as:

A. SBP + HR

B. SBP × HR / 100

C. DBP × HR

D. CO × SVR

✓ Answer: B

💡 **Rationale & Explanation:**

Rate Pressure Product (RPP) = Systolic BP × Heart Rate / 100. It's an indirect measure of myocardial oxygen demand. Normal resting RPP is around 72. Angina symptoms typically occur at the same RPP threshold for each patient (their 'ischemic threshold'). This is clinically useful in cardiac rehab — if a patient gets chest pain at RPP of 200, design their exercise program to stay below that level. RPP is a more meaningful indicator of cardiac stress than HR or BP alone.

├— KINESIOLOGY

29. The scapulohumeral rhythm describes the ratio of glenohumeral to scapulothoracic movement during arm elevation. The normal ratio is:

A. 3:1 (GH:ST)

B. 1:1 (GH:ST)

C. 2:1 (GH:ST)

D. 4:1 (GH:ST)

✓ Answer: C

💡 **Rationale & Explanation:**

The scapulohumeral rhythm is 2:1 (GH to ST). For every 3° of arm elevation: 2° occurs at the glenohumeral joint and 1° occurs at the

scapulothoracic joint. So for 180° of total arm elevation: 120° at GH and 60° at ST. When this rhythm is disrupted (e.g., frozen shoulder, rotator cuff tear), you see abnormal compensatory movements — like excessive shoulder shrugging. Assessing scapulohumeral rhythm is essential in shoulder evaluation.

---

30. In OPEN kinetic chain knee extension, what is the arthrokinematic motion at the tibiofemoral joint?

A. Anterior tibial glide with knee extension

B. Posterior tibial glide with knee extension

C. Medial tibial rotation with knee extension

D. Inferior tibial glide with knee extension

✓ Answer: A

💡 Rationale & Explanation:

In open kinetic chain (OKC) knee extension: the TIBIA moves on the fixed femur. The tibia is CONCAVE. Concave-on-convex rule: glide is in the SAME direction as bone motion. Since the bone moves into extension (anteriorly), the tibial glide is ANTERIOR. Think: 'Shin goes forward, joint surfaces go forward.' Clinically, if knee extension is limited, mobilize with anterior tibial glides. In CKC (squatting), the FEMUR moves on the fixed tibia, and the rules reverse.

---

31. The 'screw-home mechanism' of the knee is:

A. Medial rotation of the tibia during terminal knee flexion

B. Lateral rotation of the tibia during terminal knee extension

C. PCL tightening during mid-range flexion

D. Patellar tendon tightening at full extension

✓ Answer: B

💡 Rationale & Explanation:

The screw-home mechanism is the automatic LATERAL ROTATION of the tibia (in OKC) during the LAST few degrees of knee extension. It 'locks' the knee into extension, making standing efficient. The medial femoral condyle is longer than the lateral, so it continues rolling after

the lateral side finishes — forcing the tibia to externally rotate. To initiate flexion from full extension, you must UNLOCK the knee: the popliteus medially rotates the tibia. Popliteus = 'key that unlocks the knee.'

---

32. In gait analysis, what percentage of the gait cycle is occupied by stance phase?

A. 40%

B. 50%

C. 60%

D. 70%

✓ Answer: C

💡 **Rationale & Explanation:**

Normal gait: Stance phase = 60%, Swing phase = 40%. Double support (both feet on ground) occurs twice per gait cycle, each lasting about 10% of the cycle. Double support DECREASES as walking speed increases and disappears entirely when you start RUNNING (both feet airborne during float phase). This double support distinction is how you define walking vs. running — a key biomechanics concept for the boards.

---

33. The force couple responsible for upward rotation of the scapula involves:

A. Upper trapezius, lower trapezius, and serratus anterior

B. Rhomboids and middle trapezius

C. Serratus anterior and levator scapulae

D. Lower trapezius and pectoralis minor

✓ Answer: A

💡 **Rationale & Explanation:**

Scapular upward rotation is produced by a force couple: upper trapezius (pulls the clavicle up/back), lower trapezius (pulls the inferior scapular angle down/medially), and serratus anterior (pulls the inferior angle forward/laterally). These three create coordinated scapular

rotation. If any one is weak (e.g., serratus anterior from long thoracic nerve palsy), the force couple is disrupted and upward rotation fails. Rotator cuff rehab MUST include scapular muscle training — the scapula is the foundation.

---

34. Patellofemoral joint reaction force (PFJRF) is HIGHEST during which activity?

A. Walking on level ground

B. Going down stairs

C. Deep squat (>90° knee flexion)

D. Stationary cycling

✓ Answer: C

💡 **Rationale & Explanation:**

Patellofemoral joint reaction force increases progressively with knee flexion angle: walking (~0.5x BW) < stair climbing (~3.3x BW) < squatting to 90° (~7.8x BW) < deep squat (up to 20x BW). This explains why patients with patellofemoral pain syndrome are instructed to limit knee flexion beyond 90° and avoid deep squats. Cycling generates lower PFJRF because the arc of motion is limited and loads are distributed more evenly.

---

35. Muscle force production is HIGHEST at which point in the length-tension relationship?

A. At maximum shortening

B. At maximum elongation (maximum stretch)

C. At the resting (optimal) length

D. At 50% of resting length

✓ Answer: C

💡 **Rationale & Explanation:**

The length-tension relationship shows that a muscle produces maximum active force at its OPTIMAL (resting) length. At this length, there's maximum overlap between actin and myosin filaments — maximum cross-bridge formation = maximum force. If the muscle is

too short or too long, force decreases. This is why joint position affects strength. Example: the wrist flexors are stronger with the wrist at neutral than fully flexed. Passive tension adds to total force at long muscle lengths.

PATHOLOGY

36. The classic triad of Parkinson's disease consists of:

A. Tremor, ataxia, dementia

B. Tremor, rigidity, bradykinesia

C. Spasticity, weakness, ataxia

D. Tremor, chorea, dystonia

✓ Answer: B

💡 **Rationale & Explanation:**

Parkinson's disease classic triad: TREMOR + RIGIDITY + BRADYKINESIA (sometimes a 4th is added: postural instability). The tremor is a resting tremor (pill-rolling, 4-6 Hz, disappears with movement). Rigidity is lead-pipe or cogwheel type. Bradykinesia means slowness — patients have difficulty initiating movement (freezing), reduced arm swing, small shuffling steps (festination), and micrographia. In PT, we use LSVT-BIG and cued walking (rhythmic auditory stimulation) to address these deficits.

---

37. In which stage of wound healing does collagen synthesis PEAK?

A. Hemostasis (day 0-3)

B. Inflammatory phase (day 1-6)

C. Proliferative phase (day 4-21)

D. Remodeling phase (day 21 onward)

✓ Answer: C

💡 **Rationale & Explanation:**

Collagen synthesis PEAKS during the proliferative phase (days 4-21). During this phase, fibroblasts migrate in, lay down type III collagen (immature, weak), and blood vessels form (angiogenesis). The wound contracts. Type III is then gradually replaced by stronger Type I collagen during remodeling. Maturation continues for up to 2 years. By 6 weeks, wound tensile strength is only ~50% of normal. PT: gentle mobilization during proliferative phase, more aggressive during remodeling for scar management.

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38. An 'upper motor neuron' lesion produces which clinical presentation?

A. Flaccid paralysis, fasciculations, muscle atrophy

B. Spasticity, hyperreflexia, positive Babinski sign

C. Flaccid paralysis, absent reflexes, no Babinski

D. Ataxia, intention tremor, nystagmus

✓ Answer: B

💡 **Rationale & Explanation:**

UMN lesion (damage above the spinal cord, e.g., stroke): Spasticity + Hyperreflexia + Positive Babinski + Clonus + Clasp-knife response. The UMN normally inhibits spinal reflexes; when damaged, the reflexes are released/exaggerated. LMN lesion (e.g., peripheral nerve injury): Flaccid paralysis + Hyporeflexia + Fasciculations + Muscle atrophy. Babinski NEGATIVE. Cerebellar lesion: Ataxia, intention tremor, nystagmus — NOT weakness or reflex changes. These distinctions are crucial for the neuro section of the PT boards.

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39. Osteoporosis is defined by the WHO as a bone mineral density (BMD) T-score of:

A. -1.0 or above

B. Between -1.0 and -2.5

C. -2.5 or below

D. +1.0 or below

✓ Answer: C

💡 **Rationale & Explanation:**

WHO T-score definitions: Normal = ≥ -1.0; Osteopenia = -1.0 to -2.5; Osteoporosis = ≤ -2.5; Severe osteoporosis = ≤ -2.5 + fragility fracture. The T-score compares a patient's BMD to a healthy 30-year-old (peak bone mass). A T-score of -2.5 means the patient's bone density is 2.5 standard deviations BELOW peak. PT prescribes weight-bearing exercises, resistance training, and fall prevention to reduce fracture risk. AVOID excessive spinal flexion in osteoporotic patients.

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40. A red, hot, swollen joint with fever — the MOST likely diagnosis requiring immediate physician referral is:

A. Rheumatoid arthritis flare

B. Osteoarthritis

C. Septic arthritis

D. Gout

✓ Answer: C

💡 **Rationale & Explanation:**

Septic arthritis is a PT red flag requiring IMMEDIATE referral. A hot, swollen, red joint with FEVER in someone who appears systemically unwell is septic arthritis until proven otherwise. Bacteria (most commonly Staph aureus) invade the joint space and destroy cartilage rapidly — within 24-48 hours, irreversible damage begins. The key red flag: FEVER + monoarticular joint inflammation = refer NOW. Gout also causes hot, red joints but is usually episodic and not associated with systemic fever.

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41. Rheumatoid arthritis (RA) characteristically presents with joint involvement that is:

A. Asymmetric, weight-bearing joints predominant

B. Symmetric, small joints of hands and feet, with morning stiffness >1 hour

C. Asymmetric, DIP joints predominantly

D. Monoarticular, large weight-bearing joints

✓ Answer: B

💡 **Rationale & Explanation:**

RA is a systemic autoimmune disease with SYMMETRIC involvement of small joints of hands (MCP and PIP — NOT DIP), feet (MTP joints), and wrists, with morning stiffness >1 hour. 'RA hates DIP joints' — DIP involvement points to psoriatic arthritis or osteoarthritis. RA features: swan neck deformity (PIP hyperextension + DIP flexion), boutonniere deformity (PIP flexion + DIP hyperextension), ulnar deviation at MCPs. PT focuses on joint protection, activity modification, and appropriate exercise.

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42. The most common site for a herniated intervertebral disc in the lumbar spine is:

A. L1-L2

B. L2-L3

C. L3-L4

D. L4-L5 and L5-S1

✓ **Answer: D**

💡 **Rationale & Explanation:**

L4-L5 and L5-S1 account for about 95% of lumbar disc herniations. L4-L5 disc: typically compresses the L5 nerve root → weakness of great toe dorsiflexion (EHL), numbness on dorsum of foot, impaired heel walking. L5-S1 disc: compresses S1 nerve root → weakness of plantar flexion (gastrocnemius), absent Achilles reflex, numbness on lateral foot. Straight leg raise (SLR) test is the gold standard for lumbar nerve root compression — positive at <70° with dermatomal pain reproduction.

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43. Grades of muscle strength on the MRC scale: Grade 3 means:

A. No muscle contraction

B. Flicker of contraction, no movement

C. Active movement against gravity only (full ROM)

D. Active movement against gravity AND some resistance

✓ **Answer: C**

💡 **Rationale & Explanation:**

MRC Manual Muscle Testing scale: 0 = No contraction; 1 = Flicker (trace contraction); 2 = Full ROM but GRAVITY ELIMINATED (tested horizontally); 3 = Full ROM AGAINST GRAVITY only; 4 = Full ROM against gravity + SOME resistance; 5 = Full ROM against gravity + FULL/NORMAL resistance. Grade 3 is the critical cutoff — the muscle can move through full range against gravity but fails with any added load. Grade ≤2 = needs gravity-eliminated positioning; Grade ≥3 = can begin standard exercises.

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44. The ASIA impairment scale grade 'C' describes a patient with SCI as:

A. Complete lesion, no sensory or motor below level

B. Sensory but NO motor function preserved below level

C. Motor function preserved below level but majority of muscles <3/5

D. Motor function preserved with majority of key muscles ≥3/5

✓ **Answer: C**

💡 **Rationale & Explanation:**

ASIA Impairment Scale (AIS): A = Complete (no motor or sensory below injury level); B = Sensory incomplete (sensory preserved but no motor); C = Motor incomplete (motor preserved below level, but MAJORITY of key muscles have grade <3/5); D = Motor incomplete (MAJORITY of key muscles have grade ≥3/5); E = Normal. AIS C vs D is the critical distinction: both have motor function below the lesion, but AIS D patients are functionally stronger. AIS D patients typically achieve community ambulation.

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45. Lhermitte's sign in a cervical spine patient indicates:

A. Nerve root compression at C5-C6

B. Irritation of the dura or spinal cord (myelopathy/demyelination)

C. Facet joint impingement

D. Vascular compromise of the vertebral artery

✓ **Answer: B**

💡 **Rationale & Explanation:**

Lhermitte's sign: electric shock-like sensation radiating down the spine and into the limbs with CERVICAL FLEXION. It indicates pathological sensitivity of the posterior columns of the cervical spinal cord — seen in multiple sclerosis (most commonly), myelopathy, or post-radiotherapy. It's a MAJOR red flag in cervical spine assessment — suggests possible spinal cord involvement. If positive, avoid aggressive cervical spine manipulation and refer for MRI.

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46. The ICF model 'activity limitations' refers to:

A. Problems in body function or structure (e.g., joint swelling)

B. Difficulties an individual has in executing tasks (e.g., difficulty walking)

C. Problems with participation in life situations (e.g., can't return to work)

D. Environmental factors hindering performance

✓ Answer: B

💡 **Rationale & Explanation:**

The ICF model has three dimensions: Body Function & Structure (impairments — what's wrong in the body), Activity (limitations — difficulty executing tasks, e.g., can't walk >100m, can't dress independently), and Participation (restrictions — problems engaging in life roles, e.g., can't work). PT practice should address all ICF levels: treat impairments, improve activity performance, and maximize participation. The ICF is the WHO's framework — Philippine PRC boards love this conceptual framework!

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47. In acute compartment syndrome, the CLASSIC 5 P's include all EXCEPT:

A. Pain

B. Pallor

C. Paresthesia

D. Palpable crepitus

✓ Answer: D

💡 **Rationale & Explanation:**

The 5 P's of compartment syndrome: Pain (out of proportion to injury, worsens with passive stretch) + Pressure (palpable tense compartment) + Paresthesia + Paralysis + Pallor (+ Pulselessness = 6 Ps). Palpable crepitus is associated with fractures (bone grinding) or subcutaneous emphysema — NOT compartment syndrome. Compartment syndrome occurs when pressure within a fascial compartment exceeds perfusion pressure. It's a SURGICAL EMERGENCY — fasciotomy must be performed within 6 hours. PT red flag: pain with passive stretch is the EARLIEST sign.

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48. Wallerian degeneration following peripheral nerve injury refers to:

A. Regeneration of axons proximal to the injury

B. Degeneration of the axon and myelin DISTAL to the injury site

C. Inflammatory reaction at the injury site

D. Formation of a neuroma at the injury site

✓ **Answer: B**

💡 **Rationale & Explanation:**

Wallerian degeneration: after peripheral nerve injury (Sunderland grade 2 and above), the axon and myelin DISTAL to the injury site degenerate. The axon breaks down and Schwann cells phagocytose the debris. The endoneurial tubes remain as a scaffold for regeneration. Axon regeneration proceeds at ~1-4 mm/day from the injury site. If the tube is disrupted (neurotmesis), regeneration can't proceed properly and a neuroma forms. If function doesn't return 3 months after injury, NCS/EMG and surgical consultation are warranted.

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49. In lateral epicondylitis (tennis elbow), the MOST commonly involved muscle/tendon is:

A. Extensor carpi radialis longus

B. Extensor digitorum communis

C. Extensor carpi radialis brevis (ECRB)

D. Extensor carpi ulnaris

✓ **Answer: C**

💡 **Rationale & Explanation:**

Lateral epicondylitis predominantly involves the EXTENSOR CARPI RADIALIS BREVIS (ECRB) origin at the lateral epicondyle. The histopathology shows angiofibroblastic changes (not inflammatory cells) — that's why it's more accurately called a tendinopathy. Why ECRB? It's the most loaded of the extensors during grip and wrist extension activities. Treatments: eccentric strengthening, deep transverse friction massage, instrument-assisted soft tissue mobilization (IASTM). Positive Mill's test confirms the diagnosis.

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50. Which finding would be MOST suspicious for a deep vein thrombosis (DVT) in a hospitalized postoperative patient?

A. Bilateral ankle edema improving with elevation

B. Unilateral calf swelling, warmth, and tenderness with positive Homan's sign

C. General lower extremity fatigue after walking

D. Symmetric lower extremity cramping at night

✓ **Answer: B**

💡 **Rationale & Explanation:**

DVT red flags in a post-op patient: UNILATERAL calf swelling + warmth + tenderness + positive Homan's sign (calf pain on dorsiflexion). Classic risk factors: Virchow's Triad — Stasis (immobility after surgery), Hypercoagulability (post-surgical state), and Endothelial damage (surgical trauma). DVT is a PT RED FLAG — do NOT massage the leg! Dislodged clot → pulmonary embolism (PE) → life-threatening. Stop treatment, notify medical team immediately.

ANATOMY

51. The 'lumbrical muscles' of the hand produce which motion?

A. Flex the MCP joints and extend the IP joints

B. Extend the MCP joints and flex the IP joints

C. Abduct the fingers

D. Adduct the fingers

✓ Answer: A

💡 Rationale & Explanation:

The lumbricals are unique — they originate from the tendons of the flexor digitorum profundus and insert into the extensor expansion. This arrangement allows them to FLEX the MCP joints (knuckles) while simultaneously EXTENDING the IP joints (PIP and DIP). They are the 'L-muscles' — the action forms an 'L' shape at the finger. They also fine-tune finger positioning during precision grip. Supplied by the median nerve (1st and 2nd lumbricals) and ulnar nerve (3rd and 4th lumbricals). The interossei have a similar function but also abduct/adduct the fingers.

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52. The 'anatomical position' is defined as:

A. Patient lying supine with arms at sides

B. Patient standing erect, face forward, arms at sides, palms facing FORWARD (supinated)

C. Patient standing with arms abducted 90°

D. Patient prone with arms overhead

✓ Answer: B

💡 Rationale & Explanation:

Anatomical position: the REFERENCE STANDARD for all directional terms. The person is STANDING UPRIGHT, facing FORWARD, arms at the sides, and PALMS FACING FORWARD (supinated). This is critical — if you forget the palms-forward part, the terms medial/lateral for the forearm get reversed. In anatomical position, the radius is on the lateral side and the ulna is medial. Every anatomical direction — anterior/posterior, medial/lateral, proximal/distal — is relative to this standard position.

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53. Which muscle is the primary medial rotator of the humerus?

A. Infraspinatus

B. Teres minor

C. Subscapularis

D. Supraspinatus

✓ Answer: C

💡 Rationale & Explanation:

The subscapularis is THE primary internal (medial) rotator of the shoulder. It's the largest and strongest rotator cuff muscle, occupying the subscapular fossa on the anterior surface of the scapula. It also adducts and extends the humerus. To remember: 'Sub-scapularis = Subscapular fossa = underside of scapula = faces forward = Internal rotation.' The infraspinatus and teres minor are EXTERNAL rotators. The subscapularis is tested with the 'Lift-off test' (Gerber's test) — inability to lift the hand off the lower back indicates subscapularis insufficiency.

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54. The Achilles tendon is formed by the union of which muscles?

A. Gastrocnemius and plantaris

B. Gastrocnemius and soleus

C. Soleus and tibialis posterior

D. Gastrocnemius, soleus, and plantaris

✓ Answer: B

💡 Rationale & Explanation:

The Achilles tendon (calcaneal tendon) is formed by the confluence of the gastrocnemius and soleus tendons. These two muscles together form the TRICEPS SURAE. The gastrocnemius (2 heads — medial and lateral) crosses both the knee and ankle, making it a biarticular muscle — it plantar flexes the ankle AND assists knee flexion. The soleus only crosses the ankle (uniarticular). The plantaris has a tiny separate tendon. The Achilles inserts into the posterior calcaneus. It's the thickest and strongest tendon in the body — yet the most commonly ruptured in sports (Thompson test diagnoses complete rupture).

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55. In lateral compartment syndrome of the leg, which muscles are at risk?

A. Tibialis anterior and extensor hallucis longus

B. Gastrocnemius and soleus

C. Fibularis (peroneus) longus and brevis

D. Flexor hallucis longus and flexor digitorum longus

✓ Answer: C

💡 Rationale & Explanation:

The leg has 4 compartments: Anterior (tibialis anterior, extensor digitorum longus, EHL, fibularis tertius — dorsiflexors and toe extensors); Lateral (fibularis longus and brevis — evertors); Superficial posterior (gastrocnemius, soleus, plantaris — plantar flexors); Deep posterior (tibialis posterior, flexor digitorum longus, FHL — plantar flexors and invertors). Lateral compartment syndrome affects the FIBULARIS (PERONEAL) muscles — evertor weakness and numbness on the dorsum of the foot (superficial peroneal nerve). Anterior compartment syndrome (most common) affects dorsiflexors — foot drop.

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56. The sacral plexus is formed by the nerve roots:

A. T12-L4

B. L4-S3

C. S2-S4 only

D. L2-L5

✓ Answer: B

💡 Rationale & Explanation:

The sacral plexus is formed by L4-S3 (with L4 also contributing to the lumbar plexus — the 'lumbosacral trunk' is L4-L5). The sacral plexus gives rise to: the sciatic nerve (L4-S3 — the largest nerve in the body), the superior gluteal nerve (L4-L5-S1 — innervates gluteus medius, gluteus minimus, TFL), the inferior gluteal nerve (L5-S1-S2 — innervates gluteus maximus), the pudendal nerve (S2-S3-S4 — perineum, external sphincters), and the posterior cutaneous nerve of

the thigh. This is heavily tested in the context of SCI, hip surgery, and pelvic pathology.

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57. The medial and lateral menisci of the knee differ in that:

A. The lateral meniscus is larger and more firmly attached

B. The medial meniscus is more mobile and less frequently injured

C. The medial meniscus is more firmly attached (less mobile) and more frequently injured

D. The lateral meniscus is attached to the MCL making it less mobile

✓ Answer: C

💡 **Rationale & Explanation:**

Key differences: The MEDIAL meniscus is C-shaped (larger radius), firmly attached to the MCL and the joint capsule, LESS MOBILE — this is why it's injured more often. The LATERAL meniscus is O-shaped (more circular), less firmly attached, MORE MOBILE — can escape impingement more easily. The medial meniscus is injured 3-5x more often than the lateral, especially in the classic 'unhappy triad' (ACL + MCL + medial meniscus). The lateral meniscus is injured in discoid meniscus conditions and isolated lateral sprains.

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58. The deltoid muscle is innervated by which nerve?

A. Suprascapular nerve

B. Long thoracic nerve

C. Axillary nerve

D. Radial nerve

✓ Answer: C

💡 **Rationale & Explanation:**

The deltoid is innervated by the AXILLARY NERVE (C5-C6). Remember: the axillary nerve comes off the posterior cord of the brachial plexus and wraps around the surgical neck of the humerus. Injury (from surgical neck fracture or shoulder dislocation) causes deltoid paralysis — the patient can't initiate shoulder abduction (first 15° of abduction = deltoid). Beyond 15°, the supraspinatus takes over. The teres minor is

also innervated by the axillary nerve. Test deltoid power: abduction against resistance at mid-range (around 90°).

PHYSIOLOGY

59. **The 'all-or-nothing' principle of nerve conduction means:**

A. A neuron either fires completely or not at all — once threshold is reached, the action potential is the same magnitude regardless of stimulus strength

B. All neurons fire simultaneously during voluntary movement

C. Only large neurons respond to strong stimuli

D. Motor units either fire maximally or rest during voluntary contraction

✓ Answer: A

💡 **Rationale & Explanation:**

The all-or-nothing principle: once a nerve reaches its THRESHOLD (~ -55mV), it fires a COMPLETE action potential of fixed magnitude, regardless of how strong the stimulus is. A subthreshold stimulus produces nothing; a suprathreshold stimulus produces the SAME action potential as a threshold stimulus. This is like a gun trigger — a gentle touch doesn't fire; once enough pressure is applied, it fires completely. For GRADED responses (different strengths of muscle contraction): the CNS varies the NUMBER of motor units recruited (spatial summation) and the FREQUENCY of firing (temporal summation) — not the magnitude of individual action potentials.

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60. **The starling law of the heart states:**

A. Heart rate is directly proportional to blood pressure

B. Stroke volume increases as ventricular end-diastolic volume (preload) increases — the more the heart fills, the harder it contracts

C. Cardiac output is inversely proportional to stroke volume

D. Afterload decreases stroke volume by increasing preload

✓ Answer: B

💡 **Rationale & Explanation:**

Starling's Law (Frank-Starling mechanism): The GREATER the stretch of the cardiac muscle fibers (end-diastolic volume, or PRELOAD), the MORE FORCEFULLY the heart contracts and the GREATER the stroke volume. Think of it as a rubber band — the more you stretch it (to a point), the harder it snaps back. This is a fundamental cardiac autoregulatory mechanism. Clinical application: in heart failure, the Frank-Starling curve is shifted downward — the same preload produces less stroke volume. Exercise increases venous return (preload) → larger SV → higher CO. This is one reason aerobic training increases cardiac efficiency.

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61. During CONCENTRIC muscle contraction, the muscle:

A. Lengthens while developing tension

B. Stays the same length while developing tension

C. Shortens while developing tension

D. Relaxes progressively while lengthening

✓ Answer: C

💡 **Rationale & Explanation:**

Three types of muscle contractions: CONCENTRIC = muscle SHORTENS while developing tension (the muscle generates force to move a load, e.g., biceps curl on the way up — the bicep shortens as the elbow flexes). ECCENTRIC = muscle LENGTHENS while developing tension (the muscle controls a load while lengthening, e.g., bicep curl on the way down — the bicep lengthens to control the descent). ISOMETRIC = muscle STAYS THE SAME LENGTH while developing tension (no movement, e.g., holding a weight still). Eccentric contractions produce the most force and cause the most DOMS (delayed onset muscle soreness). They are also the basis of eccentric training for tendinopathy.

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62. The primary chemical mediators of INFLAMMATION include:

A. ATP and creatine phosphate

B. Histamine, prostaglandins, bradykinin, and cytokines (interleukins, TNF-α)

C. Insulin and glucagon

D. Epinephrine and norepinephrine

✓ Answer: B

💡 **Rationale & Explanation:**

Inflammation mediators: HISTAMINE (from mast cells) — vasodilation + increased permeability (immediate response). PROSTAGLANDINS (from arachidonic acid via COX enzymes) — pain sensitization, fever, vasodilation — NSAIDs block COX enzymes to reduce these. BRADYKININ — pain, vasodilation, increased permeability. CYTOKINES (IL-1, IL-6, TNF-α) — systemic effects (fever, acute phase proteins), attract immune cells. LEUKOTRIENES — bronchoconstriction in asthma. This is why NSAIDs reduce post-injury pain/swelling — they block prostaglandin synthesis. But remember: PEACE & LOVE suggests avoiding NSAIDs early in acute injury to allow the inflammatory process that initiates healing.

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63. Muscle hypertrophy from resistance training is due primarily to:

A. Increase in the NUMBER of muscle fibers (hyperplasia)

B. Increase in the SIZE of existing muscle fibers (hypertrophy of myofibrils)

C. Increase in the number of motor neurons

D. Decrease in muscle fiber fatigue threshold

✓ Answer: B

💡 **Rationale & Explanation:**

Resistance training-induced muscle strength and size gains are primarily due to HYPERTROPHY — an increase in the SIZE of existing muscle fibers (increase in myofibril number and diameter within each fiber). The fibers get BIGGER, not more numerous. Some very limited hyperplasia (fiber splitting) may occur in extreme cases, but it's NOT the primary mechanism. Mechanism: mechanical loading → microtrauma → satellite cell activation → protein synthesis (mTOR

pathway) → bigger fibers. Early strength gains (first 4-6 weeks) are primarily NEURAL (better motor unit recruitment, coordination) before true hypertrophy occurs. This is why beginners get strong quickly even before getting noticeably bigger.

KINESIOLOGY

64. The 'loose-packed position' (resting position) of the hip joint is:

A. Full extension with neutral rotation

B. 30° flexion, 30° abduction, slight external rotation

C. 90° flexion, 90° abduction

D. Full extension, adduction, and internal rotation

✓ Answer: B

💡 **Rationale & Explanation:**

Loose-packed (resting) position = maximum capsular laxity, minimum contact stress, most comfortable for the inflamed joint. For the HIP: 30° flexion, 30° abduction, slight external rotation. This is the position patients naturally adopt when the hip is acutely inflamed — it minimizes intra-articular pressure. Compare: the CLOSE-packed position of the hip (maximum congruency, maximum capsular tension) is FULL EXTENSION with INTERNAL ROTATION and ABDUCTION. For joint mobilization: mobilize in the LOOSE-PACKED position. For capsular tightening assessment: compare to close-packed restriction.

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65. When analyzing posture from the side (sagittal plane), the plumb line in ideal standing alignment should pass through:

A. Anterior to the knee and hip joints

B. Through the earlobe, shoulder joint, hip joint, just anterior to the knee, and anterior to the lateral malleolus

C. Posterior to the hip and anterior to the knee

D. Directly through the center of all joints

✓ Answer: B

💡 **Rationale & Explanation:**

Ideal posture plumb line (lateral view): Earlobe → Cervical vertebral bodies (C4-C5 level) → Shoulder joint (acromion) → Hip joint (greater trochanter) → Just ANTERIOR to the knee joint (lateral condyle) → ANTERIOR to the lateral malleolus. The plumb line passes ANTERIOR to the knee because the knee is in slight hyperextension in standing, and ANTERIOR to the ankle because the body's mass is slightly anterior to the talocrural joint. Deviations: forward head posture (ear anterior to plumb line), kyphosis (thoracic spine posterior), lordosis (lumbar spine anterior), knee hyperextension or flexion.

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66. The 'Q-angle' of the knee is defined as the angle between:

A. The femur and the tibia in the frontal plane

B. A line from ASIS to the center of the patella and a line from the center of the patella to the tibial tubercle

C. The angle of the patellar tendon to the tibial shaft

D. The angle between the quadriceps muscle and the femoral shaft

✓ **Answer: B**

💡 **Rationale & Explanation:**

Q-angle (Quadriceps angle): the angle formed by: 1) a line from the ANTERIOR SUPERIOR ILIAC SPINE (ASIS) to the CENTER OF THE PATELLA, and 2) a line from the center of the patella to the TIBIAL TUBERCLE. Normal values: males ≈ 10-14°, females ≈ 15-20° (females are naturally larger due to wider pelvis). Increased Q-angle (>20°) increases lateral patellar tracking force, contributing to patellofemoral pain syndrome. Factors that increase Q-angle: genu valgum, external tibial torsion, femoral anteversion, pes planus (flat foot). The Q-angle is reduced by: correction of femoral anteversion, correction of pes planus with orthotics, hip external rotator strengthening.

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67. The BIOMECHANICAL role of the plantar fascia is:

A. To dorsiflex the foot actively during push-off

B. To function as a passive tension band that stores and releases elastic energy during gait (windlass mechanism)

C. To invert the foot during walking

D. To support the lateral longitudinal arch only

✓ **Answer: B**

💡 **Rationale & Explanation:**

The plantar fascia (plantar aponeurosis) runs from the calcaneus to the proximal phalanges. It functions as a TENSION BAND (truss) that supports the medial longitudinal arch. The WINDLASS MECHANISM: during terminal stance when the toes dorsiflex (extend), the plantar fascia wraps around the metatarsal heads (like a windlass/winch), tightening the arch and storing elastic energy for push-off. This stiffens the foot for efficient propulsion. In plantar fasciitis: the fascia is overloaded (especially at the calcaneal attachment), causing degeneration and pain. Tight calves (reduced ankle dorsiflexion) increase plantar fascia tension — hence the importance of calf stretching in plantar fasciitis treatment.

├— PATHOLOGY

68. The classic presentation of carpal tunnel syndrome WORSENS with:

A. Manual work during the day

B. Night-time — symptoms classically wake the patient from sleep; also worsens with prolonged wrist flexion

C. Cold weather only

D. Exercise and physical activity

✓ **Answer: B**

💡 **Rationale & Explanation:**

CTS classic symptom pattern: symptoms (numbness, tingling, burning in the median nerve distribution — thumb, index, middle, radial half of ring finger) are WORSE AT NIGHT — the combination of wrist flexion during sleep, reduced movement reducing venous drainage, and decreased vasodilation at rest increases carpal tunnel pressure. Patients perform the 'flick sign' — shaking the hand to relieve

symptoms. Also worsens with prolonged wrist flexion (Phalen's), typing, gripping, and activities that increase carpal tunnel pressure. Improves with moving the hand, shaking it, and avoiding provocative positions. The wrist splint in neutral position at night is a first-line treatment.

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69. Myotome testing: weakness of elbow extension indicates involvement of which nerve root?

A. C5

B. C6

C. C7

D. C8

✓ Answer: C

💡 **Rationale & Explanation:**

Cervical myotomes: C3-C4 = neck lateral flexion, scapular elevation; C5 = shoulder abduction (deltoid), elbow flexion; C6 = wrist extension (ECRB/ECRL), elbow flexion; C7 = ELBOW EXTENSION (triceps), wrist flexion, finger extension; C8 = finger flexion (FDP, FDS); T1 = finger abduction/adduction (intrinsics). The triceps (elbow extension) is THE C7 muscle to remember. C7 is also responsible for wrist flexion and finger extension. So the full C7 pattern: weak triceps + weak wrist flexors + weak finger extensors + sensory loss over the middle finger. The triceps reflex (C7) is diminished or absent.

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70. The clinical features of a CAUDA EQUINA SYNDROME (CES) include:

A. Unilateral leg pain with normal bladder and bowel

B. Bilateral leg weakness/numbness, saddle anesthesia, and bowel/bladder dysfunction — a surgical emergency

C. Upper motor neuron signs with spasticity and hyperreflexia

D. Ataxia and intention tremor

✓ Answer: B

💡 **Rationale & Explanation:**

Cauda equina syndrome (CES) is a NEUROSURGICAL EMERGENCY caused by compression of the nerve roots in the cauda equina (below L1-L2). Classic presentation: BILATERAL lower extremity weakness and sensory loss + SADDLE ANESTHESIA (numbness in the perineum, inner thighs, buttocks — the 'saddle area') + BOWEL AND BLADDER DYSFUNCTION (urinary retention or incontinence, fecal incontinence). Signs are LOWER MOTOR NEURON (flaccidity, absent reflexes) — NOT UMN spasticity. This is because the cauda equina = individual nerve roots (not the spinal cord itself). EMERGENCY: immediate MRI + urgent surgical decompression within 24-48 hours to prevent permanent incontinence. A major PT red flag.

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71. A positive Babinski sign in an ADULT indicates:

A. Normal reflex response

B. Lower motor neuron lesion

C. Upper motor neuron lesion (corticospinal tract pathology)

D. Cerebellar lesion

✓ Answer: C

💡 **Rationale & Explanation:**

Babinski sign (plantar reflex): stroke the lateral sole of the foot from heel to ball. Normal adult response: plantar FLEXION of the toes (negative Babinski). POSITIVE Babinski (abnormal in adults): the great toe EXTENDS (dorsiflexes) upward and the other toes fan out. Positive Babinski = UPPER MOTOR NEURON LESION — damage to the corticospinal tract (stroke, MS, spinal cord injury, ALS). It's NORMAL in infants (under 2 years) because the corticospinal tract is not yet fully myelinated. This is one of the most important neurological examination findings for PRC PT boards — memorize it.

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72. The Phalen's maneuver, Tinel's sign, and monofilament testing are used collectively to assess:

A. Cubital tunnel syndrome (ulnar nerve at elbow)

B. Carpal tunnel syndrome (median nerve compression) and peripheral sensory nerve integrity

C. Thoracic outlet syndrome

D. Cervical radiculopathy

✓ **Answer: B**

💡 **Rationale & Explanation:**

These three tests are used in carpal tunnel syndrome (CTS) assessment: Phalen's test = sustained wrist flexion 60 seconds → reproduces median nerve symptoms; Tinel's sign = tapping over the carpal tunnel → tingling in the median nerve distribution (percussion test). Monofilament testing (Semmes-Weinstein monofilament) = quantitative sensory testing — tests THRESHOLD for touch/pressure detection. The 5.07 monofilament (10 grams) is used to detect loss of protective sensation. Normal = feel the 3.84 monofilament. Loss of 5.07 monofilament feeling = protective sensation is gone (diabetic neuropathy screening). In CTS, combine all three for best diagnostic accuracy.

ANATOMY

73. The pes anserinus ('goose's foot') is formed by the conjoined tendons of which three muscles?

A. Rectus femoris, vastus medialis, vastus lateralis

B. Sartorius, gracilis, and semitendinosus

C. Biceps femoris, semitendinosus, semimembranosus

D. Gastrocnemius, soleus, plantaris

✓ **Answer: B**

💡 **Rationale & Explanation:**

The pes anserinus ('goose's foot') = the conjoined insertion of SARTORIUS + GRACILIS + SEMITENDINOSUS on the medial proximal tibia, just distal to the medial tibial condyle. Memory trick: 'Say Grace before Tea' (Sartorius, Gracilis, Semitendinosus). All three flex and medially rotate the knee. The pes anserinus bursa lies deep to these tendons. Pes anserinus bursitis causes medial knee pain approximately

3-4 cm below the joint line — common in obese patients with OA, runners, and triathletes. Don't confuse with MCL injury (MCL pain is at the joint line, not distal to it).

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74. The anatomical term 'valgus' refers to:

A. A medial deviation of the distal segment away from the midline

B. A lateral deviation of the distal segment away from the midline (angulation toward the midline at the joint)

C. Flexion at a joint beyond normal range

D. Internal rotation of the joint

✓ Answer: B

💡 **Rationale & Explanation:**

Valgus vs. Varus — one of the most commonly confused terms: VALGUS = the distal part DEVIATES LATERALLY (away from the midline) relative to the proximal part — the joint angles INWARD toward the midline. Examples: GENU VALGUM (knock-knees — the knees point inward, the feet apart); CUBITUS VALGUS (increased carrying angle at elbow); HALLUX VALGUS (bunion — great toe points toward the 2nd toe). VARUS = the distal part deviates MEDIALLY — the joint angles OUTWARD away from the midline. Examples: GENU VARUM (bowlegs); CUBITUS VARUS (gunstock deformity after supracondylar fracture). Memory: VALGUS = 'L' shaped like the L in 'Lateral deviation of the distal part.'

├— PHYSIOLOGY

75. The oxygen-hemoglobin dissociation curve shifts to the RIGHT (decreased O2 affinity) with:

A. Decreased temperature, decreased CO2, increased pH

B. Increased temperature, increased CO2 (decreased pH), and increased 2,3-DPG

C. Decreased 2,3-DPG and decreased CO2

D. Alkalosis and hypothermia

✓ **Answer: B**

💡 **Rationale & Explanation:**

Oxygen-hemoglobin dissociation curve: Rightward shift = DECREASED O2 affinity = MORE O2 released to tissues (Bohr effect). Caused by: INCREASED temperature, INCREASED CO2 (hypercapnia), DECREASED pH (acidosis), and INCREASED 2,3-DPG. This makes physiological sense — actively working muscles are WARM, producing MORE CO2 and lactic acid (acidosis) — the rightward shift ensures that MORE oxygen is offloaded to where it's needed. Leftward shift = INCREASED O2 affinity = less O2 released (fetal Hgb, alkalosis, hypothermia, low 2,3-DPG). In PT, understanding this helps interpret exercise physiology and the physiological responses to aerobic training.

ANATOMY

76. The coracobrachialis muscle attaches from the coracoid process to:

A. The greater tubercle of the humerus

B. The medial aspect of the humeral shaft (middle third)

C. The lesser tubercle of the humerus

D. The radial tuberosity

✓ **Answer: B**

💡 **Rationale & Explanation:**

The coracobrachialis runs from the coracoid process (tip) to the MEDIAL ASPECT of the middle third of the humeral shaft. It's a weak flexor and adductor of the shoulder. Its key clinical significance: the MUSCULOCUTANEOUS NERVE pierces through the coracobrachialis to enter the anterior compartment of the arm (where it innervates the biceps and brachialis). A coracobrachialis mass or entrapment can therefore compress the musculocutaneous nerve, causing weakness of elbow flexion and sensory loss over the lateral forearm. This is relatively uncommon but is a classic anatomical board question.

77. The 'triangular interval' or 'lower triangular space' in the posterior shoulder is traversed by:

A. Axillary nerve and posterior circumflex humeral artery

B. Radial nerve and profunda brachii artery

C. Suprascapular nerve and suprascapular artery

D. Thoracodorsal nerve

✓ Answer: B

💡 **Rationale & Explanation:**

The posterior shoulder has three spaces: Quadrangular space (teres minor sup, teres major inf, long head triceps medial, surgical neck humerus lateral): axillary nerve + posterior circumflex humeral artery. Triangular space (teres minor sup, teres major inf, long head triceps lateral): circumflex scapular artery. Triangular interval (lower triangular space — teres major sup, long head triceps medial, lateral head triceps lateral): RADIAL NERVE + PROFUNDA BRACHII ARTERY. The radial nerve enters the posterior compartment of the arm through the triangular interval, then travels in the spiral groove. This is relevant in posterior shoulder pathology and nerve injury classification.

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78. The tibial nerve is a branch of the sciatic nerve and innervates all of the following EXCEPT:

A. Gastrocnemius

B. Tibialis posterior

C. Fibularis (peroneus) longus

D. Flexor digitorum longus

✓ Answer: C

💡 **Rationale & Explanation:**

The sciatic nerve divides into the TIBIAL NERVE and the COMMON PERONEAL (FIBULAR) NERVE, usually at the popliteal fossa. The TIBIAL NERVE innervates the POSTERIOR compartment muscles: gastrocnemius, soleus, plantaris, tibialis posterior, flexor digitorum longus, flexor hallucis longus, and intrinsic foot muscles. The

COMMON PERONEAL NERVE innervates the LATERAL compartment (fibularis/peroneus longus and brevis) and ANTERIOR compartment (tibialis anterior, EDL, EHL, fibularis tertius). Fibularis longus = PERONEAL nerve = NOT tibial. This distinction matters clinically: tibial nerve injury = flat foot (loss of plantar flexion/inversion); common peroneal nerve injury = foot drop (loss of dorsiflexion/eversion).

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79. The 'anatomical snuffbox' borders are formed by:

A. EPL (ulnar), APL + EPB (radial)

B. FCR (radial), FCU (ulnar), and palmaris longus (floor)

C. EPL (radial), APL + EPB (ulnar)

D. EDC (dorsal), APL (volar)

✓ Answer: A

💡 **Rationale & Explanation:**

The anatomical snuffbox: Ulnar border = Extensor Pollicis LONGUS (EPL) — the longer tendon that crosses to the ulnar side. Radial border = Abductor Pollicis Longus (APL) + Extensor Pollicis Brevis (EPB) — the shorter, more radial tendons. Floor = scaphoid + trapezium. Roof = skin. Contents: radial artery (where you can palpate it), cephalic vein, superficial branch of radial nerve. To remember: 'EPL is ALONE on the ulnar side; APL and EPB are TOGETHER on the radial side.' Tenderness in the snuffbox floor = scaphoid fracture until proven otherwise. The radial artery passes through the floor on its way to form the deep palmar arch.

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80. The FEMORAL NERVE (L2-L4) innervates which muscles?

A. Gluteus medius, gluteus minimus, TFL

B. Quadriceps femoris (rectus femoris, vastus medialis, vastus lateralis, vastus intermedius) and sartorius

C. Hamstrings, adductor magnus

D. Hip flexors only — iliopsoas

✓ Answer: B

💡 **Rationale & Explanation:**

The femoral nerve (L2-L3-L4) innervates: QUADRICEPS (all four heads — rectus femoris, vastus medialis, vastus lateralis, vastus intermedius) = knee extension; SARTORIUS = hip flexion + external rotation + knee flexion; PECTINEUS = hip flexion + adduction; ILIOPSOAS (L1-L2-L3 via femoral nerve branches or direct lumbar plexus branches) = hip flexion. Sensory: anterior thigh + medial leg (saphenous nerve — the longest sensory branch of the femoral nerve, running to the medial foot). Femoral nerve damage (e.g., from hematoma in the iliac fossa, total hip arthroplasty): quadriceps paralysis, absent patellar reflex, difficulty climbing stairs.

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81. The blood supply to the head of the femur in adults comes PRIMARILY from:

A. Artery of the ligamentum teres (obturator artery)

B. Medial and lateral femoral circumflex arteries (via retinacular vessels)

C. Femoral artery directly

D. Profunda femoris artery via perforators

✓ Answer: B

💡 **Rationale & Explanation:**

In ADULTS, the femoral head receives blood supply PRIMARILY through the MEDIAL FEMORAL CIRCUMFLEX ARTERY (and lateral femoral circumflex artery to a lesser extent), which give rise to the RETINACULAR ARTERIES that travel along the femoral neck under the capsule and enter the femoral head. The artery of the ligamentum teres (from the obturator artery) provides only a MINOR supply in adults (it was important in children). This explains why a FEMORAL NECK FRACTURE can sever the retinacular vessels → avascular necrosis (AVN) of the femoral head. Garden's classification of femoral neck fractures predicts AVN risk — displaced fractures (Garden III/IV) have high AVN rates.

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82. The lumbar plexus is formed by which nerve roots?

A. T12-L4

B. L1-L4 (with T12 contributing in some individuals)

C. L2-L5

D. L3-S1

✓ Answer: B

💡 **Rationale & Explanation:**

The lumbar plexus is formed by L1-L4 (with partial T12 in some individuals). Key branches: Iliohypogastric (L1), Ilioinguinal (L1), Genitofemoral (L1-L2), Lateral femoral cutaneous nerve (L2-L3 — sensory, supplies lateral thigh; entrapment = meralgia paresthetica), Femoral nerve (L2-L3-L4 — major motor nerve of anterior thigh), Obturator nerve (L2-L3-L4 — innervates adductors, medial thigh sensation). L4-L5 contribute to BOTH the lumbar plexus AND the sacral plexus via the lumbosacral trunk. The femoral and obturator nerves are the most clinically relevant branches for PT assessment.

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83. The obturator nerve (L2-L4) innervates the:

A. Quadriceps and sartorius

B. Hamstring muscles

C. Hip adductor muscles (adductor longus, brevis, magnus — anterior portion) and gracilis

D. Hip abductor muscles

✓ Answer: C

💡 **Rationale & Explanation:**

The obturator nerve (L2-L3-L4) innervates the HIP ADDUCTORS: adductor longus, adductor brevis, adductor magnus (anterior portion), gracilis, and the obturator externus. It provides sensory supply to the medial thigh. Clinically: obturator nerve entrapment (e.g., in athletes from the obturator canal) causes groin pain + medial thigh pain + adductor weakness — can mimic athletic pubalgia or adductor strain. Obturator nerve injury during pelvic surgery (bladder/uterine procedures) causes adductor weakness and medial thigh sensory loss. Test adductor strength (squeezing a pillow between the knees) to assess obturator nerve function.

PHYSIOLOGY

84. The 'double product' or 'pressure-rate product' is used in cardiology and cardiac PT to estimate:

A. Lung capacity

B. Myocardial oxygen consumption

C. Cardiac output at rest

D. Total peripheral resistance

✓ Answer: B

💡 Rationale & Explanation:

Double product (Rate Pressure Product, RPP) = Systolic BP × Heart Rate / 100. It correlates closely with MYOCARDIAL OXYGEN CONSUMPTION (mVO2) — the demand the heart places on its own oxygen supply via the coronary arteries. When RPP exceeds a patient's ischemic threshold, the coronary supply cannot meet demand → angina or ST changes. Example: a patient with angina at RPP of 200 (SBP 160, HR 125) — design exercise to keep RPP below 180. The RPP is calculated before, during, and after exercise in cardiac rehab. It's more clinically meaningful than HR or BP alone because it reflects the combined cardiac workload.

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85. What physiological mechanism makes eccentric muscle contractions produce greater force than concentric contractions at the same velocity?

A. More motor units are recruited during eccentric contractions

B. Titin (a giant elastic protein) contributes additional passive force as the sarcomere lengthens beyond its optimal length

C. Eccentric contractions use faster-twitch muscle fibers

D. Eccentric contractions are powered by ATP more efficiently

✓ Answer: B

💡 Rationale & Explanation:

Eccentric contractions produce MORE FORCE than concentric contractions at the same velocity — sometimes 20-60% more. Three mechanisms: 1) TITIN — a giant elastic protein that acts like a spring in the sarcomere; when the sarcomere is stretched during eccentric loading, titin stores elastic energy and contributes passive force — significantly enhancing total force. 2) CROSS-BRIDGE DETACHMENT is slower under eccentric conditions — more cross-bridges stay attached longer. 3) Less ATP is consumed per unit of force (more efficient energy use). Clinical relevance: eccentric exercises produce MORE stimulus for strength gain and tendon remodeling (Alfredson protocol) but ALSO MORE DOMS — because of the high forces and microtrauma involved.

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86. The primary fuel source during HIGH-INTENSITY exercise (above anaerobic threshold) is:

A. Fat oxidation (beta-oxidation)

B. Protein metabolism

C. Glycolysis (anaerobic) — glucose/glycogen breakdown without oxygen

D. Oxidative phosphorylation of fatty acids

✓ Answer: C

💡 **Rationale & Explanation:**

Exercise fuel sources vary by intensity: LOW intensity = primarily FAT oxidation (aerobic, slow but high capacity). MODERATE intensity = mix of fat + carbohydrates. HIGH INTENSITY (above lactate/anaerobic threshold) = primarily CARBOHYDRATES — specifically ANAEROBIC GLYCOLYSIS, which can produce ATP rapidly without oxygen, but produces LACTIC ACID as a byproduct. As intensity increases further, oxygen delivery can't keep up with demand → more anaerobic glycolysis → lactate accumulates → fatigue. Fat CANNOT be metabolized quickly enough to power high-intensity exercise. This is why carbohydrate loading matters for endurance athletes and why proper periodization includes both aerobic and anaerobic training.

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87. Lymphedema results from impaired lymphatic drainage causing:

A. Arterial insufficiency and tissue ischemia

B. Accumulation of protein-rich fluid in the interstitium, causing swelling and tissue fibrosis

C. Venous hypertension only

D. Loss of arteriole tone causing fluid extravasation

✓ Answer: B

💡 Rationale & Explanation:

Lymphedema: failure of the lymphatic system to drain the INTERSTITIAL FLUID, causing accumulation of PROTEIN-RICH fluid (unlike the low-protein transudate of venous edema). The stagnant protein-rich fluid causes: chronic inflammation, fibrosis (scarring of soft tissues), increased infection risk (bacteria thrive in protein-rich fluid), and progressive skin changes (brawny, hardened skin). Primary lymphedema: congenital lymphatic dysplasia. Secondary lymphedema: most common cause = post-mastectomy (axillary lymph node dissection), post-radiation, infection, trauma. PT treatment: complete decongestive therapy (CDT) = manual lymphatic drainage (MLD) + multilayer compression bandaging + exercise + skin care + self-management education.

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88. Cyanosis (bluish skin discoloration) appears when the concentration of deoxygenated hemoglobin in the capillaries reaches:

A. 1 g/dL

B. 5 g/dL

C. 10 g/dL

D. 15 g/dL

✓ Answer: B

💡 Rationale & Explanation:

Cyanosis becomes VISIBLE when the concentration of DEOXYGENATED hemoglobin (deoxy-Hgb) in the capillaries reaches approximately 5 g/dL (5 grams per 100 mL of blood). This is peripheral cyanosis — usually seen first in the FINGERTIPS, LIPS, and NAIL BEDS (areas with sluggish circulation). Central cyanosis (tongue and mucous

membranes) indicates more severe hypoxemia. Clinically important: ANEMIC patients may have severe hypoxemia WITHOUT visible cyanosis (not enough total hemoglobin to reach 5 g/dL of deoxy-Hgb). POLYCYTHEMIC patients may develop cyanosis at higher SpO2 levels. SpO2 monitoring is more reliable than visual assessment of cyanosis.

KINESIOLOGY

89. The force-velocity relationship in muscle mechanics states:

A. Faster concentric contractions produce MORE force

B. As velocity of concentric contraction increases, force DECREASES; as velocity of eccentric contraction increases, force INCREASES up to a plateau

C. Force is constant regardless of velocity

D. Velocity and force are directly proportional in all conditions

✓ Answer: B

💡 Rationale & Explanation:

Force-velocity relationship: CONCENTRIC contractions: as velocity (speed of shortening) INCREASES, force DECREASES. At very slow speeds, maximum force is generated; at maximum velocity (no load), force approaches zero (sprinting with no resistance). ECCENTRIC contractions: as velocity of lengthening INCREASES, force INCREASES, then plateaus. This asymmetry explains why: 1) You can lower more weight than you can lift (eccentric stronger than concentric); 2) Fast-moving isokinetic testing at high speeds shows decreased concentric peak torque; 3) Plyometric training at high velocities develops power (force × velocity). Understanding this relationship is fundamental to designing exercise programs for power, strength, or endurance.

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90. 'Creep' in viscoelastic tissue mechanics refers to:

A. The elastic rebound when a load is removed

B. Continued deformation of tissue over time under a CONSTANT LOAD

C. Rapid deformation from an acute impact force

D. The energy lost as heat during cyclic loading

✓ Answer: B

💡 **Rationale & Explanation:**

Viscoelastic tissues (cartilage, ligaments, tendons, spinal discs) exhibit both ELASTIC (spring-like) and VISCOUS (fluid-like) properties. CREEP: When a constant load is applied to viscoelastic tissue, the tissue continues to DEFORM OVER TIME — even though the load doesn't increase. Example: spinal disc height decreases throughout the day due to sustained compressive loading (axial creep) — you're slightly shorter in the evening than in the morning. Clinical relevance: prolonged sitting (constant load on intervertebral discs and posterior ligaments) → disc creep → increased disc nuclear displacement → increased back pain risk. Tissues need TIME to recover from creep when the load is removed (hence the importance of MOVEMENT BREAKS).

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91. The Q-angle is INCREASED (worsened) by which postural condition?

A. Genu varum (bow legs)

B. Genu valgum (knock knees) and excessive subtalar pronation (flat foot)

C. High arch (pes cavus)

D. External tibial torsion alone

✓ Answer: B

💡 **Rationale & Explanation:**

Factors that INCREASE the Q-angle (normal: males ≤14°, females ≤20°): GENU VALGUM (knock knees) — the ASIS moves more lateral relative to the tibial tubercle, widening the angle; SUBTALAR PRONATION / FLAT FOOT (pes planus) — the tibial tubercle internally rotates, increasing the Q-angle; FEMORAL ANTEVERSION (excessive internal rotation of the femoral neck) — ASIS is more medially positioned,

increasing the Q-angle; LATERAL TIBIAL TUBERCLE POSITION. Increased Q-angle = increased lateral vector force on the patella = lateral patellar tilt/tracking problems = patellofemoral pain syndrome (PFPS). Treatment: orthotics for pes planus, hip external rotator strengthening, VMO training, McConnell taping.

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92. In normal gait, which phase of the gait cycle requires the MOST energy expenditure?

A. Midstance (single-limb support)

B. Loading response (initial weight acceptance after heel strike)

C. Terminal stance and pre-swing (push-off)

D. Midswing (limb advancement)

✓ Answer: C

💡 **Rationale & Explanation:**

Energy cost in gait: The PUSH-OFF phase (terminal stance and pre-swing) requires the most metabolic energy — the plantar flexors (gastrocnemius-soleus complex) must generate substantial force to propel the body forward, requiring significant muscular work. Loading response also requires energy (eccentric quad and tibialis anterior work) but is more about energy ABSORPTION (storing and redirecting kinetic energy) than generation. In pathological gait (e.g., post-stroke, CP, hip OA), energy cost of walking INCREASES — often 50-300% above normal — due to muscle weakness, spasticity, and loss of normal energy-saving mechanisms (pendulum effect, elastic storage in the Achilles tendon). This is why gait training aims to restore normal energy-efficient patterns.

PATHOLOGY

93. The Ottawa Ankle Rules indicate that X-ray is required for ankle injuries with:

A. Pain anywhere around the ankle

B. Inability to weight-bear (4 steps) OR bone tenderness at the posterior edge or tip of the lateral malleolus OR medial malleolus (within 6 cm)

C. Any ankle swelling

D. Pain with ankle dorsiflexion only

✓ Answer: B

💡 **Rationale & Explanation:**

Ottawa Ankle Rules (OAR): X-ray is required if the patient has: 1) Inability to weight-bear both immediately AND in the ED (≥4 steps); 2) Bone tenderness at the POSTERIOR EDGE or TIP of the LATERAL MALLEOLUS (distal 6 cm); 3) Bone tenderness at the POSTERIOR EDGE or TIP of the MEDIAL MALLEOLUS (distal 6 cm). Ottawa Foot Rules: bone tenderness at the BASE OF THE 5TH METATARSAL or the NAVICULAR = X-ray for foot fractures. Sensitivity ~99% for ankle/foot fractures — if all criteria are NEGATIVE, you can safely rule out fracture and avoid radiation. The OAR are cost-effective clinical decision tools widely implemented in emergency and PT settings.

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94. The hallmark feature of ANKYLOSING SPONDYLITIS (AS) on X-ray is:

A. Loss of disc space at L4-L5

B. 'Bamboo spine' — calcification of spinal ligaments and annular fibers causing vertebral fusion

C. Osteophyte formation at the anterolateral margins

D. Pedicle destruction and vertebral body collapse

✓ Answer: B

💡 **Rationale & Explanation:**

Ankylosing Spondylitis (AS) is a seronegative spondyloarthropathy (HLA-B27 positive in ~90% of cases). The hallmark X-ray finding is the 'BAMBOO SPINE' — calcification and ossification of the annular fibers, anterior longitudinal ligament, and interspinous ligaments, causing the vertebral column to fuse together. The spine becomes completely rigid. Early finding: 'shiny corners' (Romanus lesion) — erosion followed by sclerosis at the corners of vertebral bodies. Early disease:

sacroiliitis (SI joint inflammation, bilateral and symmetric). PT: posture exercises (extension focus), breathing exercises (chest expansion is reduced due to costovertebral joint fusion), swimming, and fall prevention (rigid spine = fracture risk).

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95. Spondylolisthesis is defined as:

A. Fracture of the pedicle

B. Forward displacement (slippage) of one vertebra on the vertebra below

C. Lateral curvature of the spine

D. Abnormal rotation of the vertebral body

✓ Answer: B

💡 **Rationale & Explanation:**

Spondylolisthesis: FORWARD DISPLACEMENT (slipping forward) of one vertebra ON THE VERTEBRA BELOW. Most common: L4-L5 or L5-S1. Grades (Meyerding classification): I=0-25% slip, II=25-50%, III=50-75%, IV=75-100%, V=spondyloptosis (complete displacement). Types: Isthmic (defect in pars interarticularis — spondylolysis, common in gymnasts/football linemen); Degenerative (facet arthritis, most common in adults 40+); Congenital; Traumatic; Pathological. Symptoms: low back pain, buttock pain, neurogenic claudication. PT: core stabilization, extension-based exercises (usually), avoid high-impact loading. High-grade slips or neurological compromise: surgical consideration.

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96. The PRIMARY cause of plantar fasciitis is:

A. Infection of the plantar fascia

B. Repetitive overload causing micro-tears and degenerative changes (tendinopathy) at the medial calcaneal attachment of the plantar fascia

C. Nerve entrapment of the sural nerve

D. Inflammatory arthritis of the midfoot joints

✓ Answer: B

💡 **Rationale & Explanation:**

Plantar fasciitis (more accurately, plantar fasciOPATHY — it's a degenerative condition, not truly inflammatory): REPETITIVE OVERLOAD → micro-tears at the proximal attachment of the plantar fascia on the medial calcaneal tubercle → failed healing response → degeneration. Risk factors: tight Achilles/gastrocnemius (limited dorsiflexion increases plantar fascia strain), pes planus (overpronation increases strain on the medial fascia), increased BMI, sudden increase in training volume, poor footwear, prolonged standing on hard surfaces. Symptoms: sharp pain at the medial heel, WORST with the FIRST STEPS in the morning (after rest, the fascia tightens overnight; first steps re-tear it). Treatment: calf/plantar fascia stretching, heel cup, orthotics, night splint, ECSWT, LLLT.

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97. Gout is caused by the deposition of which crystals in joints?

A. Calcium pyrophosphate dihydrate (CPPD) crystals

B. Monosodium urate (MSU) crystals from elevated serum uric acid

C. Calcium oxalate crystals

D. Hydroxyapatite crystals

✓ **Answer: B**

💡 **Rationale & Explanation:**

Gout: MONOSODIUM URATE (MSU) CRYSTALS deposit in joints when serum uric acid is chronically elevated (hyperuricemia). Classic presentation: ACUTE GOUTY ARTHRITIS — sudden, excruciating pain, swelling, redness, and warmth in the 1st METATARSOPHALANGEAL JOINT (big toe — 'podagra') or other joints. Attacks are SELF-LIMITING (3-10 days). Triggers: alcohol (beer/spirits), purine-rich foods (organ meats, shellfish), dehydration, trauma, surgery. X-ray: 'rat-bite erosions' with overhanging edges (late stage). Serum uric acid may be NORMAL during an acute attack. MSU crystals under polarized light = NEGATIVELY BIREFRINGENT (yellow when parallel). CPPD crystals = pseudogout (positively birefringent, blue when parallel), which affects different joints (wrist, knee).

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98. Myasthenia gravis is a disease of the neuromuscular junction characterized by:

A. Destruction of myelin sheaths in the central nervous system

B. Autoimmune destruction of acetylcholine receptors at the motor end-plate, causing fatigable muscle weakness

C. Progressive degeneration of motor neurons in the spinal cord

D. Dysfunction of calcium channels in muscle fiber membranes

✓ Answer: B

💡 **Rationale & Explanation:**

Myasthenia Gravis (MG): an AUTOIMMUNE disease where antibodies DESTROY or BLOCK ACETYLCHOLINE RECEPTORS (AChR) at the neuromuscular junction. The signal from the nerve (acetylcholine) can't bind to enough receptors → weakened muscle contraction. Key feature: FATIGABLE WEAKNESS — strength diminishes with REPEATED effort and improves with REST. Classic presentation: PTOSIS (drooping eyelid — extraocular and levator palpebrae muscles affected first), DIPLOPIA, DYSPHAGIA. Can progress to respiratory compromise (myasthenic crisis — emergency). Diagnosis: Tensilon (edrophonium) test, serum AChR antibodies, EMG (decremental response). PT: pacing, fatigue management, breathing exercises, energy conservation.

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99. Amyotrophic Lateral Sclerosis (ALS) involves degeneration of:

A. Only sensory neurons in the dorsal root ganglia

B. Both upper motor neurons (cortex, brainstem) AND lower motor neurons (anterior horn cells), causing progressive muscle weakness without sensory loss

C. Only lower motor neurons — causing progressive flaccid paralysis

D. The cerebellum and basal ganglia — causing ataxia and tremor

✓ Answer: B

💡 **Rationale & Explanation:**

ALS (Lou Gehrig's disease): MIXED UMN + LMN degeneration. UMN signs: spasticity, hyperreflexia, Babinski positive. LMN signs: fasciculations, muscle atrophy, flaccid weakness, absent reflexes. BOTH

present in the same patient simultaneously is a hallmark. KEY: SENSORY FUNCTION IS PRESERVED (no sensory loss) — this distinguishes ALS from other progressive neurological conditions. Cognition is usually preserved (in most types) until late. Prognosis: median survival 2-5 years from symptom onset. Cause of death: respiratory failure. PT role: maintaining function, energy conservation, assistive devices, communication aids, respiratory exercises, and end-of-life quality of life. ALS requires a compassionate, palliative approach from the PT team.

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100. The most common type of stroke (cerebrovascular accident) in terms of mechanism is:

A. Hemorrhagic stroke (intracerebral hemorrhage) — 70% of all strokes

B. Ischemic stroke (thrombotic or embolic) — 80-87% of all strokes

C. Subarachnoid hemorrhage — 50% of all strokes

D. Lacunar infarcts — 40% of all strokes

✓ Answer: B

💡 **Rationale & Explanation:**

Stroke distribution: ISCHEMIC STROKE (80-87%): caused by a CLOT blocking blood flow — either THROMBOTIC (clot forming in place, usually on atherosclerotic plaque) or EMBOLIC (clot traveling from elsewhere — heart, carotid artery). HEMORRHAGIC STROKE (13-20%): bleeding into or around the brain — either intracerebral hemorrhage (hypertension most common cause) or subarachnoid hemorrhage (ruptured aneurysm). LACUNAR INFARCTS are a subset of ischemic strokes (small vessel disease, ~25% of ischemic strokes). This classification matters because: treatment differs (ischemic = tPA eligible; hemorrhagic = tPA contraindicated). In PT: both types cause similar motor deficits but prognosis and complication profiles may differ.

ANATOMY

101. **The pudendal nerve canal (Alcock's canal) is located in:**

A. The femoral triangle

B. The lateral wall of the ischiorectal fossa within the obturator fascia

C. The posterior wall of the pelvis

D. The medial compartment of the thigh

✓ Answer: B

💡 **Rationale & Explanation:**

The pudendal nerve (S2-S3-S4) exits the pelvis through the greater sciatic foramen (below the piriformis), wraps around the ischial spine, and enters the PUDENDAL CANAL (Alcock's canal) — a tunnel in the OBTURATOR FASCIA on the LATERAL WALL OF THE ISCHIORECTAL FOSSA. It then travels anteriorly to innervate the perineum, external anal sphincter, external urethral sphincter, and genitalia. PUDENDAL NERVE ENTRAPMENT (rare but debilitating) causes perineal/pelvic pain, dyspareunia, and sphincter dysfunction. Diagnosed by pudendal nerve motor terminal latency testing or nerve block at the ischial spine. Relevant in pelvic floor PT — an emerging subspecialty in Philippine PT practice.

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102. **In the shoulder, the 'subacromial space' normally measures approximately:**

A. 1-2 mm

B. 5-7 mm (normal is ≥6 mm)

C. 10-12 mm

D. 15-18 mm

✓ Answer: B

💡 **Rationale & Explanation:**

The subacromial space (distance between the inferior acromion and the superior humeral head) normally measures approximately 9-10 mm on standard shoulder X-ray (supraspinatous outlet view). A subacromial space of <6 mm is considered significantly reduced and is associated with SUBACROMIAL IMPINGEMENT and ROTATOR CUFF TEARS. A complete supraspinatus tear allows the humeral head to 'ride

up' — if the space is <7 mm, suspect a full-thickness tear. The subacromial bursa and supraspinatus tendon normally occupy this space. Understanding this anatomy helps interpret shoulder imaging and explains why EXERCISES THAT COMPRESS the subacromial space (pure abduction in the frontal plane) worsen impingement.

├─ PHYSIOLOGY

103. The FICK equation calculates oxygen consumption (VO2). During maximal aerobic exercise, VO2max is primarily limited by:

A. Lung diffusion capacity

B. Cardiac output (oxygen delivery capacity of the cardiovascular system)

C. Muscle mitochondrial density

D. Hemoglobin concentration only

✓ Answer: B

💡 **Rationale & Explanation:**

VO2max limitation: CARDIAC OUTPUT is the PRIMARY LIMITER of VO2max in healthy individuals. Even though muscles can extract more oxygen (wide a-vO2 diff), the heart's maximal pumping capacity limits total oxygen delivery. Evidence: direct cardiac manipulation (heart transplant, heart failure treatment) markedly changes VO2max; training-induced VO2max improvements are almost entirely due to increased maximal cardiac output (higher SV from cardiac remodeling). Pulmonary diffusion is usually NOT limiting in healthy individuals at sea level (lungs can handle the demand). Mitochondrial density limits endurance performance at submaximal intensities but is not the primary VO2max limiter. In elite athletes, multiple factors interact.

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104. What happens to the HR response to SUBMAXIMAL exercise after a period of aerobic training?

A. HR increases more to achieve the same work rate

B. HR at a given submaximal work rate DECREASES (training bradycardia)

C. HR remains exactly the same

D. HR becomes irregular during submaximal exercise

✓ Answer: B

💡 **Rationale & Explanation:**

TRAINING EFFECT on submaximal HR: after a period of aerobic training, the heart becomes MORE EFFICIENT. At the SAME SUBMAXIMAL WORK RATE (same treadmill speed, same watt output), the trained heart achieves the required cardiac output with a LOWER HEART RATE because STROKE VOLUME has increased (larger chambers, better contractility). This is 'training bradycardia' — the hallmark of aerobic conditioning. Clinically: trained athletes have lower resting HR (50-60 bpm vs. ~72 bpm untrained) and lower HR at equivalent submaximal workloads. In cardiac rehab, monitoring HR response is key — as patients improve, they should achieve target exercise intensities at progressively lower HR (indicating cardiac adaptation and improved efficiency).

KINESIOLOGY

105. The ratio of type I to type II muscle fibers in the vastus lateralis of an untrained person is approximately:

A. 90% type I, 10% type II

B. Approximately 50:50 (50% type I and 50% type II)

C. 30% type I, 70% type II

D. 10% type I, 90% type II

✓ Answer: B

💡 **Rationale & Explanation:**

In the VASTUS LATERALIS of an average untrained person, the fiber type ratio is approximately 50% Type I (slow-twitch, oxidative) and 50% Type II (fast-twitch — a mix of IIa and IIx). However, this ratio varies

SIGNIFICANTLY between individuals and muscle groups: Postural muscles (soleus, erector spinae) = predominantly Type I (~70-80%); Phasic/power muscles (gastrocnemius lateral head) = more Type II. Endurance training shifts Type IIx → Type IIa (doesn't convert Type II to Type I significantly). The ratio is partially genetically determined — elite endurance athletes have up to 70-80% Type I in their locomotor muscles. This fiber type distribution explains individual differences in athletic potential and exercise response.

ANATOMY

106. The 'unhappy triad' is tested clinically using:

A. Valgus stress + McMurray + Lachman test

B. Varus stress + McMurray + posterior drawer

C. Neer's test + empty can + drop arm

D. Phalen's test + Tinel's + Watson's

✓ Answer: A

💡 **Rationale & Explanation:**

The unhappy triad (ACL + MCL + medial meniscus) is evaluated using the combination of: Valgus stress test (for MCL), McMurray test (for medial meniscus), and Lachman/anterior drawer test (for ACL). Each test addresses one of the three injured structures. Together, these form a thorough lateral knee injury assessment cluster. Remember — EACH structure needs its OWN specific test. There's no single test that catches all three injuries simultaneously. This question tests your ability to match the correct clinical tests to the specific structures of the unhappy triad.

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107. The rotator interval of the shoulder is located between:

A. Supraspinatus and subscapularis tendons

B. Infraspinatus and teres minor tendons

C. Long head of biceps and the capsule

D. Supraspinatus and infraspinatus tendons

✓ **Answer: A**

💡 **Rationale & Explanation:**

The rotator interval is the triangular space between the SUPRASPINATUS (superior) and SUBSCAPULARIS (inferior) tendons, with the coracoid process medially. It contains the long head of the biceps tendon, the coracohumeral ligament, and the superior glenohumeral ligament. Clinically: rotator interval tears or pathology contribute to shoulder instability and adhesive capsulitis. In a 'frozen shoulder,' the rotator interval is one of the primary sites of capsular contracture — explaining the characteristic loss of external rotation in adduction.

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108. Wartenberg's sign (little finger abduction at rest) indicates weakness of the:

A. Abductor digiti minimi

B. Ulnar intrinsics — particularly the 3rd palmar interosseous (which adducts the 5th finger)

C. Flexor digiti minimi

D. Extensor digiti minimi

✓ **Answer: B**

💡 **Rationale & Explanation:**

Wartenberg's sign: the little finger (5th digit) rests in ABDUCTION at rest, and the patient cannot adduct it voluntarily. This indicates weakness of the ulnar-innervated intrinsic muscles, specifically the 3rd PALMAR INTEROSSEOUS which adducts the 5th finger. In ulnar nerve palsy (especially at the elbow — cubital tunnel syndrome), all palmar interossei are weakened. The unopposed abductor digiti minimi (also ulnar, but its antagonistic adductors are weaker) allows the 5th finger to drift laterally. Wartenberg's sign is a subtle early sign of ulnar neuropathy at the elbow. Often accompanies the 'claw hand' deformity (4th and 5th finger claw) in ulnar nerve lesions.

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109. The 'anatomical neck' of the humerus is located:

A. At the narrowing below the greater and lesser tubercles (surgical neck)

B. At the articular margin of the humeral head — the rim of the joint surface

C. Along the spiral groove of the humeral shaft

D. At the capitellum-trochlea junction

✓ Answer: B

💡 Rationale & Explanation:

The ANATOMICAL NECK of the humerus: the slightly constricted region at the MARGIN OF THE ARTICULAR SURFACE of the humeral head — where the capsule of the glenohumeral joint attaches. The SURGICAL NECK: the narrow region BELOW the greater and lesser tubercles — named 'surgical' because it's where the bone MOST COMMONLY FRACTURES (hence surgeons see it often). The axillary nerve wraps around the SURGICAL NECK — injured in surgical neck fractures. The circumflex scapular and posterior circumflex humeral vessels also course near the surgical neck. Boards often test the difference: anatomical neck = articular margin; surgical neck = below the tubercles.

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110. The 'tarsal tunnel' is located at the medial ankle and contains:

A. Tibialis anterior, EDL, EHL

B. Tibialis posterior tendon, FDL, posterior tibial artery, tibial nerve, FHL

C. Fibularis longus and brevis

D. Gastrocnemius and soleus

✓ Answer: B

💡 Rationale & Explanation:

Tarsal tunnel: the fibro-osseous tunnel posterior to the medial malleolus, beneath the flexor retinaculum. Contents (medial to lateral): Tom, Dick And Very Nervous Harry = Tibialis posterior, flexor Digitorum longus, posterior tibial Artery, tibial Vein, tibial Nerve, flexor Hallucis longus. Tarsal tunnel syndrome: compression of the TIBIAL

NERVE in the tarsal tunnel, causing burning pain, tingling, and numbness on the PLANTAR SURFACE of the foot. Tinel's sign over the tarsal tunnel is positive. Compare with CTS (carpal tunnel at the wrist) — both are nerve compression syndromes, just at different anatomical 'tunnels.' Treatment: orthotics, rest, corticosteroid injection, surgical release.

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111. The primary blood supply to the knee joint is via the genicular arteries, branches of the:

A. Femoral artery

B. Popliteal artery

C. Anterior tibial artery

D. Profunda femoris artery

✓ Answer: B

💡 **Rationale & Explanation:**

The POPLITEAL ARTERY (continuation of the femoral artery behind the knee) gives off the GENICULAR ARTERIES that supply the knee joint: superior medial and lateral genicular arteries, middle genicular artery (supplies cruciate ligaments), inferior medial and lateral genicular arteries. The descending genicular artery from the femoral artery also contributes. This arterial network forms an anastomosis around the knee — important in total knee arthroplasty (surgeon must carefully preserve or ligate these vessels). The popliteal artery is at risk in posterior knee dislocations — a dislocation causing 15-40% arterial injury rate — requiring urgent vascular assessment.

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112. The 'zona orbicularis' of the hip capsule is:

A. A distinct separate ligament of the hip

B. A circular arrangement of deep capsular fibers that form a collar around the femoral neck

C. The transverse acetabular ligament

D. The labrum of the hip joint

✓ Answer: B

💡 **Rationale & Explanation:**

The zona orbicularis: a zone of circularly arranged capsular fibers that form a COLLAR or 'buttonhole' around the femoral neck (within the hip joint capsule). This creates a tight ring around the neck that helps hold the femoral head in the acetabulum — a passive stabilizer. In hip distraction techniques (joint mobilization), you must first ELONGATE through the zona orbicularis tightness before achieving true joint distraction. In hip arthroplasty, preservation of the capsule (including zona orbicularis components) contributes to post-operative stability. This is a higher-level anatomy concept that separates board-ready candidates from those who only know surface anatomy.

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113. Which nerve is at greatest risk during a posterior approach to total hip arthroplasty?

A. Femoral nerve

B. Sciatic nerve (particularly the peroneal division)

C. Obturator nerve

D. Superior gluteal nerve

✓ **Answer: B**

💡 **Rationale & Explanation:**

In the POSTERIOR APPROACH to THA, the surgeon splits the gluteus maximus and divides the short external rotators (piriformis, obturator internus, gemelli) near their femoral insertion. The SCIATIC NERVE (particularly the PERONEAL division, which lies closest to the piriformis) is at risk — either from direct injury, retraction trauma, or excessive leg lengthening. Peroneal nerve injury = foot drop (loss of dorsiflexion). Incidence: ~0.5-2% of primary THAs. PT red flags post-THA: patient cannot dorsiflex foot, numbness on dorsum of foot = suspect peroneal nerve injury. Inform surgeon immediately. In the ANTERIOR approach, the femoral nerve and lateral femoral cutaneous nerve are more at risk.

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114. The 'Shenton's line' on a hip X-ray is used to:

A. Measure acetabular coverage of the femoral head

B. Detect hip joint disruption — it is a continuous arc from the medial femoral neck to the inferior border of the pubic ramus

C. Measure femoral neck-shaft angle

D. Assess for sacroiliac joint involvement

✓ Answer: B

💡 **Rationale & Explanation:**

Shenton's line: on a standard AP pelvis X-ray, this is a smooth continuous curved line drawn along the INFERIOR BORDER OF THE FEMORAL NECK and continuing along the INFERIOR BORDER OF THE SUPERIOR PUBIC RAMUS. In a normal hip, this line is a smooth continuous arc. DISRUPTION (broken Shenton's line) indicates: hip dislocation, femoral neck fracture, developmental dysplasia of the hip (DDH), or hip subluxation. It's one of the first lines PT students learn in radiology because it's quick to assess and clinically meaningful. Always check Shenton's line when reviewing hip X-rays in PT — a broken line = refer back to the physician.

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115. The carpal bones in order from lateral to medial (proximal row) are:

A. Scaphoid, lunate, triquetrum, pisiform

B. Trapezium, trapezoid, capitate, hamate

C. Scaphoid, trapezium, capitate, hamate

D. Lunate, pisiform, triquetrum, scaphoid

✓ Answer: A

💡 **Rationale & Explanation:**

Carpal bones — two rows, lateral to medial: PROXIMAL ROW: Scaphoid, Lunate, Triquetrum, Pisiform. DISTAL ROW: Trapezium, Trapezoid, Capitate, Hamate. Memory tricks: 'Some Lovers Try Positions That They Can't Handle' (Scaphoid, Lunate, Triquetrum, Pisiform, Trapezium, Trapezoid, Capitate, Hamate). Or 'She Looks Too Pretty, Try To Catch Her.' The pisiform is a sesamoid bone within the flexor carpi ulnaris tendon — it overlies the triquetrum but is not truly a proximal row bone in the strict articular sense. The scaphoid is the

most commonly fractured carpal bone; the lunate is the most commonly DISLOCATED.

PHYSIOLOGY

116. The 'second wind' phenomenon during prolonged exercise refers to:

A. A sudden burst of speed near the end of a race

B. The transition from predominantly carbohydrate to fat metabolism as exercise continues, accompanied by reduced sense of effort

C. The effect of sports drinks on glycogen restoration

D. The return of normal breathing after hyperventilation

✓ Answer: B

💡 Rationale & Explanation:

Second wind: during the early phase of vigorous exercise, oxygen delivery lags behind demand → accumulating lactate → fatigue and breathlessness. As the cardiovascular and respiratory systems catch up and the body transitions to more efficient fat-burning metabolism, there is a subjective IMPROVEMENT in effort — the 'second wind.' Physiologically: the metabolic acidosis from lactate is buffered; mitochondrial efficiency increases; fat oxidation (which yields more ATP per gram) takes over from glycolysis; the respiratory and cardiac systems reach steady state. Understanding energy substrate transitions is fundamental to exercise physiology and appropriate exercise intensity prescription in PT.

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117. The normal serum potassium (K+) range is 3.5-5.0 mEq/L. Hyperkalemia (>5.5 mEq/L) is dangerous because:

A. It causes muscle fasciculations and atrophy

B. It can cause fatal cardiac arrhythmias by depolarizing cardiac membranes

C. It reduces nerve conduction velocity dramatically

D. It causes severe muscle cramping only

✓ **Answer: B**

💡 **Rationale & Explanation:**

Potassium is the primary INTRACELLULAR cation. Its ratio across cell membranes determines the resting membrane potential. HYPERKALEMIA (high K+): raises the extracellular K+, making the membrane potential LESS NEGATIVE → cells are more easily depolarized BUT also more difficult to repolarize → risk of CARDIAC ARRHYTHMIAS (peaked T waves, widened QRS, ventricular fibrillation — potentially fatal). Clinical in PT: patients with renal failure (poor K+ excretion) and those on potassium-sparing diuretics or ACE inhibitors are at risk. HYPOKALEMIA (low K+): muscle weakness, cramps, paralytic ileus, arrhythmias. Know the dangers of both extremes — abnormal electrolytes are PT red flags requiring medical consultation before vigorous exercise.

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118. The 'valsalva maneuver' (forced expiration against a closed glottis) during heavy lifting is dangerous because:

A. It strengthens the abdominal muscles

B. It causes an abrupt rise then fall in blood pressure — the sudden pressure change can trigger stroke or cardiovascular events in at-risk individuals

C. It reduces intra-abdominal pressure dangerously

D. It always causes hernias

✓ **Answer: B**

💡 **Rationale & Explanation:**

Valsalva maneuver: closing the glottis and bearing down (like straining for a bowel movement). Effects: phase I — brief BP RISE from aortic compression; phase II — BP FALLS as venous return drops (intrathoracic pressure impedes venous return); phase III — BP drops further; phase IV — BP REBOUNDS MARKEDLY when the maneuver is released (venous return floods the heart). The REBOUND HYPERTENSION in phase IV can trigger stroke, MI, or retinal hemorrhage in at-risk patients. In PT: instruct patients with cardiovascular disease, hypertension, aneurysm, post-sternotomy, or

recent eye surgery to EXHALE during exertion — 'breathe out when you push out.' This avoids the valsalva and its dangerous pressure swings.

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119. Sensory adaptation refers to:

A. The brain's ability to learn new motor patterns

B. The DECREASE in receptor firing rate despite a CONSTANT stimulus — the receptor becomes less responsive over time

C. The increase in sensory sensitivity with practice

D. Sensory substitution in blind individuals

✓ Answer: B

💡 **Rationale & Explanation:**

Sensory adaptation: most sensory receptors show DECREASED RESPONSE (fewer action potentials) to a CONSTANT, SUSTAINED STIMULUS over time — they 'habituate' to it. Examples: you don't feel your clothing after a few minutes; you stop noticing a constant background smell; the pressure of a chair seat becomes unconscious. TONIC (slowly adapting) receptors: Ruffini endings, Merkel's discs, proprioceptors, nociceptors — they fire continuously to sustained stimuli (important for ongoing joint position sense and sustained pain). PHASIC (rapidly adapting) receptors: Pacinian corpuscles, Meissner's corpuscles — respond only to CHANGES and movement, then quickly adapt. In PT: why it's harder to notice gradual postural changes but easy to notice sudden positional changes.

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120. The metabolic rate (energy expenditure) during exercise is measured in METs. One MET equals:

A. 1 kcal/kg/hour and ~3.5 mL O2/kg/min

B. 5 kcal/kg/hour and ~10 mL O2/kg/min

C. 10 kcal/kg/hour

D. 2.5 mL O2/kg/min only

✓ Answer: A

💡 **Rationale & Explanation:**

1 MET (Metabolic Equivalent of Task) = the resting metabolic rate = approximately 3.5 mL O2/kg/min oxygen consumption = approximately 1 kcal/kg/hour energy expenditure. To convert: if someone weighing 70 kg is exercising at 5 METs: O2 consumption = 5 × 3.5 × 70 = 1,225 mL/min = 1.225 L/min. Energy cost = 5 × 1 kcal/kg/hr × 70 kg = 350 kcal/hr. METs are used in: exercise prescription (target 3-6 METs for moderate exercise), activity classification (light <3, moderate 3-6, vigorous >6), post-cardiac event activity guidelines (avoid >3-4 METs until cleared), and disability evaluation. Essential calculation for all cardiopulmonary PT work.

├─ KINESIOLOGY

121. The 'screw-home mechanism' is REVERSED (the knee unlocks) by the action of:

A. Vastus medialis oblique (VMO)

B. Popliteus muscle — medially rotating the tibia in open chain, or laterally rotating the femur in closed chain

C. Biceps femoris

D. Gastrocnemius lateral head

✓ Answer: B

💡 Rationale & Explanation:

To unlock the knee from its closed-packed (full extension, screwed-home) position, the POPLITEUS muscle is essential. In OPEN KINETIC CHAIN: popliteus medially rotates the TIBIA (unlocking it from the lateral femoral condyle). In CLOSED KINETIC CHAIN (standing): popliteus laterally rotates the FEMUR on the fixed tibia — same unlocking effect. Popliteus is the FIRST MUSCLE TO FIRE when flexion is initiated from full extension. Origin: lateral femoral condyle. Insertion: posterior tibia. Nerve: tibial nerve (L4-L5-S1). Clinical: popliteus tendinopathy causes posterolateral knee pain with downhill walking — the popliteus eccentrically controls lateral femoral condyle anterior sliding during downhill deceleration.

122. **The 'hip-spine syndrome' describes:**

A. A condition where hip OA causes referred pain to the lumbar spine

B. The clinical relationship between limited hip mobility (especially extension) and compensatory hypermobility of the lumbar spine

C. Hip flexor tightness causing disc herniation

D. Ankylosing spondylitis affecting both the hip and spine

✓ Answer: B

💡 **Rationale & Explanation:**

Hip-spine syndrome (coined by Offierski & MacNab): limited hip motion (especially hip extension) forces the LUMBAR SPINE to compensate with hypermobility. Example: tight hip flexors → reduced hip extension during gait → the lumbar spine hyperextends to compensate → increased lumbar stress → low back pain. Or: hip OA with limited internal rotation → the patient compensates by laterally rotating the lumbar spine → LBP. Clinical implication: ALWAYS EXAMINE THE HIP in patients presenting with low back pain, and vice versa. A hip OA mimicking L4-L5 radiculopathy is a classic trap. The FABER test, hip ROM, and hip OA changes on X-ray should be part of every LBP evaluation.

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123. **The 'iliotibial band friction syndrome' occurs due to:**

A. Tears in the IT band

B. Repetitive friction of the IT band over the lateral femoral epicondyle during knee flexion-extension cycles, especially at ~30° flexion (the 'impingement zone')

C. Bursitis of the pes anserinus

D. Lateral collateral ligament strain

✓ Answer: B

💡 **Rationale & Explanation:**

IT Band Friction Syndrome (ITBFS): the IT band is a non-elastic fibrous band — it doesn't stretch significantly. At approximately 30° of knee flexion (the 'impingement angle'), the IT band moves POSTERIOR to

the lateral femoral epicondyle. With repetitive cycling between 30° flexion and extension (like running), the IT band REPEATEDLY CROSSES OVER the epicondyle → friction and inflammation. Classic presentation: lateral knee pain in runners, cyclists, especially during long runs, worsening at the same distance into a run ('the 30-minute rule'). Treatment: hip abductor strengthening (gluteus medius weakness = increased adduction at foot strike = increased IT band tension), foam rolling, training modification, addressing training errors.

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124. In biomechanics, 'ground reaction force' (GRF) during normal walking is:

A. Equal to body weight only during single limb support

B. A vertical force equal to ~120% body weight at heel strike, ~80% at midstance, ~120% again at push-off (creating the characteristic double-peak pattern)

C. Constant throughout the gait cycle

D. Only occurs at heel strike

✓ Answer: B

💡 **Rationale & Explanation:**

Ground reaction force (GRF): the force exerted by the ground on the body in response to the body's force on the ground (Newton's 3rd law). During normal walking, the vertical GRF has a characteristic DOUBLE-PEAK pattern: First peak (~120% BW) at LOADING RESPONSE (heel strike — body decelerates); Valley (~80% BW) at MIDSTANCE (body is balanced over the limb); Second peak (~120% BW) at TERMINAL STANCE/PUSH-OFF (plantar flexors propel the body forward). These peaks are used in gait analysis to assess pathological loading patterns. In running, the GRF can reach 2-3x BW. In jumping (landing), GRF can be 5-8x BW — relevant in ACL injury mechanism and plyometric training safety.

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125. The 'moment of inertia' in biomechanics determines:

A. The force required to move a joint

B. How difficult it is to rotate a body segment — increases with greater mass distributed farther from the axis of rotation

C. The velocity of limb movement

D. The energy stored in a muscle during contraction

✓ Answer: B

💡 **Rationale & Explanation:**

Moment of inertia (rotational inertia): the resistance of a body to changes in its rotational motion — analogous to mass in linear motion. Formula: $I = \Sigma(mr^2)$ where m = mass and r = distance from the axis. The farther mass is distributed FROM the rotation axis, the GREATER the moment of inertia (harder to rotate). Applications: a runner with a flexed knee during swing phase has LOWER moment of inertia (mass closer to hip axis) → less effort to swing the leg. Kicking with a prosthetic limb vs. natural limb has different inertial demands. In strength training: long-lever exercises (straight leg raise) have higher moment of inertia than short-lever (bent knee) → more muscle force required. This concept underlies exercise modification for pain and weakness.

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126. The 'knee valgus collapse' pattern during functional tasks (squatting, landing from a jump) is associated with:

A. Quadriceps dominance only

B. Combined hip internal rotation, hip adduction, knee valgus, and often foot pronation — associated with ACL injury risk, PFPS, and hip abductor weakness

C. Tibial external torsion

D. Excessive plantarflexion

✓ Answer: B

💡 **Rationale & Explanation:**

Knee valgus collapse (dynamic valgus): a movement pattern during landing, squatting, or cutting maneuvers characterized by: hip INTERNAL ROTATION + ADDUCTION (often from gluteus medius weakness) + knee VALGUS (moving inward) + foot PRONATION. This

creates dangerous VALGUS TORQUE on the knee — the primary mechanism of non-contact ACL tears (especially in female athletes, who have 2-8x higher ACL tear rates). Prevention: neuromuscular training programs (PEP program, Nordic hamstring curls, plyometrics with landing feedback), gluteus medius strengthening, core stability. The 'drop jump test' and 'single-leg squat' assessment reveal dynamic valgus. Key training cue: 'knees over toes' during all lower extremity exercises.

PATHOLOGY

127. Scoliosis is defined as a lateral curvature of the spine. A Cobb angle of >10° is required for diagnosis. Treatment with a brace is typically indicated when:

A. Cobb angle >10° in any patient

B. Cobb angle 25-40° in a skeletally immature patient (Risser 0-2) who is still growing

C. Cobb angle >60° (surgical range)

D. Cobb angle 10-20° only

✓ Answer: B

💡 Rationale & Explanation:

Scoliosis management by Cobb angle: <10° = OBSERVATION only (technically not scoliosis by definition). 10-25° = OBSERVATION with follow-up (every 4-6 months in growing adolescents). 25-40° in SKELETALLY IMMATURE patients = BRACE TREATMENT (Milwaukee brace, Boston brace, Cheneau) — brace worn 18-23 hours/day to prevent progression. >40-45° = surgical consideration (posterior spinal fusion). >50° = surgical referral. Risser sign (iliac apophysis ossification) grades skeletal maturity — Risser 0-1 = most growth remaining = highest curve progression risk = most important time to brace. PT role: exercises (Schroth method) for idiopathic scoliosis — reduces progression, improves function alongside bracing.

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128. **Dupuytren's contracture primarily affects:**

A. The tendons of the flexor digitorum profundus

B. The palmar aponeurosis (fascia), causing progressive flexion contracture of the fingers — most commonly the ring and little fingers

C. The extensor tendons of the hand

D. The intrinsic muscles of the hand

✓ Answer: B

💡 **Rationale & Explanation:**

Dupuytren's contracture: pathological THICKENING and FIBROSIS of the PALMAR APONEUROSIS (fascia palmaris), forming NODULES and CORDS that progressively FLEX the fingers (most commonly ring and little fingers) into a fixed flexion contracture at the MCP and PIP joints. Patient cannot fully extend these fingers — a functional disability for gripping objects. Risk factors: northern European descent (Viking disease), males >50, diabetes, alcohol use, smoking, epilepsy medications. Treatment: needle fasciotomy (office procedure — breaks the cord), collagenase Clostridium histolyticum injection (Xiaflex — enzymatically dissolves the cord), or surgical fasciectomy. PT post-operatively: extension splinting, scar management, ROM exercises.

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129. **Tennis elbow vs. Golfer's elbow: in GOLFER'S ELBOW (medial epicondylitis), the pain is:**

A. On the lateral epicondyle, with resisted wrist extension

B. On the MEDIAL epicondyle, with resisted WRIST FLEXION and FOREARM PRONATION — tenderness over the common flexor origin

C. On the olecranon with resisted elbow extension

D. At the bicipital groove with resisted supination

✓ Answer: B

💡 **Rationale & Explanation:**

Golfer's elbow (medial epicondylalgia / medial epicondylitis): MEDIAL epicondyle pain from overuse of the COMMON FLEXOR ORIGIN (pronator teres, FCR, palmaris longus, FCU). Resisted wrist FLEXION and forearm PRONATION reproduce pain. Distinguish from TENNIS

ELBOW (lateral epicondylalgia — ECRB at lateral epicondyle, resisted WRIST EXTENSION reproduces pain). IMPORTANT: the ULNAR NERVE runs through the cubital tunnel posterior to the medial epicondyle — medial elbow injuries must always include ulnar nerve assessment (little finger and ulnar half of ring finger numbness, Froment's sign). Co-existing ulnar nerve involvement occurs in ~20% of medial epicondylalgia cases.

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130. Thoracic outlet syndrome (TOS) neurogenic type affects which nerve roots?

A. C5-C6 (upper trunk — weakness of deltoid, biceps)

B. C8-T1 (lower trunk — weakness of intrinsic hand muscles, numbness of ulnar forearm and hand)

C. L4-L5 (lower extremity weakness)

D. C5-C7 (middle trunk — wrist and finger extensors)

✓ Answer: B

💡 Rationale & Explanation:

Neurogenic TOS: compression of the LOWER TRUNK of the brachial plexus (C8-T1) by: cervical rib, scalene muscle hypertrophy, or fibrous band between the 1st rib and cervical rib. Results in: weakness of INTRINSIC HAND MUSCLES (thenar and hypothenar atrophy — 'Gilliatt-Sumner hand'), numbness/tingling along the ULNAR FOREARM and MEDIAL HAND (C8-T1 distribution). Provocative tests: Adson's, Roos (elevated arm stress test — 3 minutes of opening/closing hands with arms at 90° — positive if symptoms reproduced), Wright's. PT treatment: scalene and pectoral stretching, thoracic spine mobilization, postural correction, first rib mobilization. Surgery (cervical rib resection, scalenectomy) for refractory cases.

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131. Adhesive capsulitis (frozen shoulder) is characterized by the CAPSULAR PATTERN of restriction, which is:

A. Loss of flexion > extension > rotation

B. Loss of external rotation > abduction > internal rotation (the Cyriax capsular pattern)

C. Loss of internal rotation only

D. Equal loss in all planes

✓ **Answer: B**

💡 **Rationale & Explanation:**

Adhesive capsulitis (frozen shoulder) presents with the CYRIAX CAPSULAR PATTERN: External Rotation (ER) is MOST restricted, then Abduction, then Internal Rotation (IR) least restricted. Pattern: ER >> ABD >> IR. This reflects the anatomy of the glenohumeral capsule — the inferior and posterior capsule contracts most severely, and these limit ER and ABD most. The classic 3 phases: Phase I — painful (6 weeks – 9 months), pain precedes stiffness; Phase II — stiffening (4-6 months), progressive loss of motion; Phase III — thawing (1-3+ years), gradual spontaneous recovery. PT: gentle end-range capsular stretching, mobilizations in pain-free range, avoid aggressive techniques in the painful phase. Most cases resolve in 2-3 years.

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132. The DIAGNOSTIC criteria for fibromyalgia according to the 2010 ACR revised criteria requires:

A. 11/18 tender points positive

B. Widespread pain index (WPI) ≥7 AND symptom severity scale (SSS) ≥5, OR WPI 3-6 AND SSS ≥9, persisting for ≥3 months

C. Elevated ESR and CRP

D. RF and anti-CCP positive

✓ **Answer: B**

💡 **Rationale & Explanation:**

2010 ACR Fibromyalgia Criteria: The tender point count was abandoned in favor of: WIDESPREAD PAIN INDEX (WPI): count of body areas (from 19) where pain occurred in the last week; SYMPTOM SEVERITY SCALE (SSS): rates fatigue, waking unrefreshed, cognitive symptoms (0-12), plus somatic symptoms. Diagnosis: WPI ≥7 AND SSS ≥5, OR WPI 3-6 AND SSS ≥9. Duration ≥3 months. No other disorder that would explain the pain. Key point: labs are NORMAL — elevated ESR/CRP or positive RF would suggest inflammatory arthritis, not

fibromyalgia. Fibromyalgia is a CENTRAL SENSITIZATION disorder — the pain amplification is in the CNS nervous system processing, not in the joints or muscles themselves.

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133. Myofascial pain syndrome (MPS) differs from fibromyalgia in that:

A. MPS is more common in males

B. MPS has REGIONAL pain from specific trigger points with referred pain patterns; fibromyalgia has WIDESPREAD pain from central sensitization

C. MPS always involves elevated inflammatory markers

D. MPS and fibromyalgia are identical conditions

✓ Answer: B

💡 **Rationale & Explanation:**

MPS (Myofascial Pain Syndrome) vs. Fibromyalgia: MPS: REGIONAL pain; involves SPECIFIC TRIGGER POINTS (hyperirritable spots in taut bands of muscle) with REFERRED PAIN in predictable patterns; responds to local treatment (dry needling, TrP release, stretching); no widespread central sensitization; normal labs; identifiable physical findings on examination. Fibromyalgia: WIDESPREAD pain (bilateral, above and below waist); central sensitization mechanism; associated with fatigue, sleep disturbance, cognitive symptoms; no specific TrP findings; no referred pain patterns; labs normal but generalized allodynia. Can COEXIST — patients with fibromyalgia may also have active TrPs. Treatments differ significantly: MPS = local; fibromyalgia = systemic (exercise, CBT, medications).

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134. Paget's disease of bone is characterized by:

A. Progressive loss of bone density (osteoporosis)

B. Abnormal bone remodeling — excessive bone resorption followed by disorganized new bone formation, producing enlarged but structurally weak bones

C. Inflammatory arthritis of multiple joints

D. Metastatic bone tumors

✓ Answer: B

💡 **Rationale & Explanation:**

Paget's disease (osteitis deformans): abnormal bone remodeling where OSTEOCLASTS excessively resorb bone → OSTEOBLASTS lay down disorganized, woven bone rapidly → the resulting bone is enlarged, highly vascular, and structurally weak. Most common sites: skull, spine, pelvis, femur, tibia. X-ray: 'cotton wool' skull, 'blade of grass' lytic front. Lab: markedly elevated ALKALINE PHOSPHATASE (marker of osteoblast activity). Complications: bowing deformities, fractures, deafness (skull involvement), spinal stenosis, osteosarcoma (rare but serious). PT awareness: know the X-ray appearance to avoid mistaking Paget's for metastatic disease; avoid high-impact activities; recognize bone pain in the elderly as a possible Paget's presentation.

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135. The classic presentation of a HERNIATED L5-S1 DISC compressing the S1 nerve root includes:

A. Weakness of great toe extension (EHL), numbness on dorsum of foot

B. Weakness of plantar flexion (gastrocnemius), absent Achilles reflex, numbness on lateral foot and sole

C. Weakness of quadriceps, diminished patellar reflex

D. Weakness of tibialis anterior, numbness on medial shin

✓ **Answer: B**

💡 **Rationale & Explanation:**

L5-S1 disc herniation compressing S1 nerve root: MOTOR: weakness of PLANTAR FLEXION (gastrocnemius-soleus = S1 primary), weakness of evertors (peroneals = S1); patient cannot perform single-leg heel raises on the affected side. SENSORY: numbness/tingling on the LATERAL FOOT, LITTLE TOE, and posterior calf. REFLEX: ACHILLES reflex (ankle jerk) DIMINISHED or ABSENT (S1). Gait: reduced push-off, shortened stride length. Compare L5 (dorsum of foot, EHL weakness, usually no reflex change) and L4 (medial foot, tibialis anterior weakness, patellar reflex diminished). S1 pattern = calf/lateral foot/Achilles reflex = most common in L5-S1 disc herniation (affects 50% of all lumbar disc herniations).

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136. Risk factors for developing deep vein thrombosis (DVT) are best described by Virchow's Triad:

A. Pain, swelling, warmth

B. Venous STASIS, HYPERCOAGULABILITY, and ENDOTHELIAL DAMAGE

C. Immobility, obesity, and dehydration only

D. Arterial occlusion, hypertension, and atherosclerosis

✓ Answer: B

💡 **Rationale & Explanation:**

Virchow's Triad — the three fundamental risk factors for DVT: 1) VENOUS STASIS: reduced blood flow velocity (prolonged immobility, long flights, post-surgery, paralysis, heart failure); 2) HYPERCOAGULABILITY: inherited (factor V Leiden, protein C/S deficiency) or acquired (post-surgery, cancer, pregnancy, OCP use); 3) ENDOTHELIAL DAMAGE: vessel wall injury from surgery, trauma, IV catheter. In PT: post-operative patients have ALL THREE factors — immobility (stasis), post-surgical state (hypercoagulability), and surgical trauma (endothelial damage). PT ROLE: early mobilization reduces stasis; well's score assessment; recognize DVT signs (unilateral calf swelling, warmth, tenderness); NEVER massage a suspected DVT limb — risk of pulmonary embolism.

ANATOMY

137. The 'carpal tunnel' floor is formed by:

A. The transverse carpal ligament

B. The carpal bones (scaphoid, trapezium, hamate, pisiform)

C. The palmar aponeurosis

D. The long flexor tendons

✓ Answer: B

💡 **Rationale & Explanation:**

The carpal tunnel is a fibro-osseous channel at the wrist. The ROOF is the transverse carpal ligament (flexor retinaculum). The FLOOR and walls are formed by the CARPAL BONES arranged in a U-shape: scaphoid and trapezium on the radial side; hamate and pisiform on the ulnar side; the rest form the floor. Contents: flexor digitorum superficialis (4 tendons), flexor digitorum profundus (4 tendons), flexor pollicis longus (1 tendon) = 9 tendons total, and the MEDIAN NERVE. When this tunnel's pressure rises (inflammation, tenosynovitis, pregnancy fluid retention), the median nerve is compressed first — causing CTS.

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138. The primary wrist extensor that is most commonly involved in lateral epicondylitis is:

A. Extensor carpi ulnaris

B. Extensor carpi radialis brevis (ECRB)

C. Extensor digitorum communis

D. Extensor pollicis longus

✓ Answer: B

💡 **Rationale & Explanation:**

Lateral epicondylitis involves the ECRB (extensor carpi radialis brevis) origin at the lateral epicondyle in ~90% of cases. The ECRB is positioned at the interface of the two radial wrist extensors — it receives the greatest tensile load during wrist extension and gripping activities. Its eccentric demand during backhand strokes, computer mouse use, and repetitive gripping activities causes micro-failure at the origin. Treatment progressions: load management → isometrics → isotonic eccentric strengthening → IASTM → return to activity. Important: the ECRB is palpated slightly anterior and distal to the most prominent part of the lateral epicondyle.

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139. Posterior interosseous nerve (PIN) entrapment causes:

A. Wrist drop

B. Finger drop — inability to extend the MCP joints of the fingers and thumb, with wrist extension preserved (wrist extends but deviates

radially)

C. Thenar atrophy

D. Sensory loss on the radial side of the hand

✓ Answer: B

💡 **Rationale & Explanation:**

The posterior interosseous nerve (PIN) is the DEEP BRANCH of the radial nerve — it's purely MOTOR (no sensory). It enters the posterior forearm through the ARCADE OF FROHSE (fibrous arch at the proximal edge of the supinator). Entrapment here causes: weakness/paralysis of FINGER EXTENSORS (EDC, EDM, EPL, EPB, APL) and wrist extensors supplied by PIN (ECU) — but the ECRL and ECRB (supplied by the radial nerve BEFORE the PIN branch) are preserved. Result: the patient can extend the WRIST (radially deviated — ECRL dominant) but CANNOT extend the MCP joints (finger drop). Compare with radial nerve injury at the spiral groove (above PIN origin) = full wrist drop.

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140. The 'saphenous nerve' is a sensory branch of:

A. Sciatic nerve

B. Femoral nerve

C. Obturator nerve

D. Common peroneal nerve

✓ Answer: B

💡 **Rationale & Explanation:**

The saphenous nerve is the LONGEST sensory branch of the FEMORAL NERVE (L3-L4). It provides sensory innervation to the: medial aspect of the knee, medial leg, medial ankle, and medial aspect of the foot (as far as the 1st MTP joint). It accompanies the great saphenous vein along the medial leg and travels through the adductor (subsartorial) canal with the femoral artery. Clinically: saphenous nerve entrapment (in the adductor canal) causes medial knee pain — sometimes confused with medial meniscal pathology or MCL injury. Important in knee surgery (medial approach) and tibial surgery (at risk of injury).

Saphenous neuralgia can also occur after saphenous vein harvest for CABG.

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141. **The 'prepatellar bursa' is located:**

A. Between the patella and the patellar tendon

B. Between the skin and the anterior surface of the patella

C. Between the patellar tendon and the tibial tuberosity

D. Inside the knee joint

✓ Answer: B

💡 **Rationale & Explanation:**

The prepatellar bursa is located between the SKIN and the ANTERIOR SURFACE of the PATELLA. It allows the skin to move freely over the patella during knee flexion. PREPATELLAR BURSITIS ('housemaid's knee'): inflammation from repetitive kneeling on hard surfaces (tile layers, gardeners, roofers). Presents as: a tender, fluctuant swelling DIRECTLY OVER the patella (not at the joint line). Can be septic (infected — warm, red, systemically unwell) or non-septic (chronic irritation). Compare with: INFRAPATELLAR bursa (between patellar ligament and tibial fat pad — 'clergyman's knee'), PES ANSERINUS bursa (medial tibia, 3-4 cm below joint line). Don't confuse these — location identifies which bursa!

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142. **The 'transverse humeral ligament' maintains:**

A. The subscapularis against the glenoid

B. The long head of the biceps tendon within the bicipital groove

C. The supraspinatus against the acromion

D. The coracohumeral ligament in place

✓ Answer: B

💡 **Rationale & Explanation:**

The transverse humeral ligament: a band of connective tissue spanning the bicipital groove (intertubercular groove) between the greater and lesser tubercles of the humerus. It RETAINS the long head of the biceps tendon within the groove. When this ligament is torn or lax, the biceps

tendon can SUBLUX or DISLOCATE OUT of the groove — causing a painful 'snap' or 'clunk' with shoulder rotation. Yergason's test (resisted supination with elbow at 90°) can elicit the subluxation/clicking — positive = pain or audible snap at the bicipital groove. The subscapularis also contributes to containing the biceps tendon medially — a subscapularis tear can allow the biceps to medially dislocate.

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143. Which structure is contained within the 'cubital tunnel' at the elbow?

A. Radial nerve

B. Ulnar nerve

C. Median nerve

D. Posterior interosseous nerve

✓ Answer: A

💡 **Rationale & Explanation:**

Wait — correction: The CUBITAL TUNNEL contains the ULNAR NERVE. It is formed by the medial epicondyle (roof = cubital tunnel retinaculum/Osborne's ligament), the olecranon (medial side), and the two heads of the flexor carpi ulnaris (floor). The ulnar nerve passes through here and is vulnerable to compression with repeated elbow flexion or direct trauma. CUBITAL TUNNEL SYNDROME: numbness and tingling in the ring and little fingers, intrinsic hand weakness (ulnar claw), Froment's sign, weak pinch. Provocative test: Elbow flexion test (maximally flex elbow 60 seconds → ulnar nerve symptoms reproduced). Compare: CARPAL TUNNEL = median nerve at the wrist; GUYON'S CANAL = ulnar nerve at the wrist.

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144. The 'medial longitudinal arch' of the foot is supported dynamically by which structure?

A. Plantar fascia alone

B. Tibialis posterior tendon — the primary DYNAMIC support for the medial longitudinal arch

C. Fibularis (peroneus) longus

D. Gastrocnemius

✓ **Answer: B**

💡 **Rationale & Explanation:**

Dynamic support of the medial longitudinal arch: STATIC supports: plantar fascia (windlass mechanism), spring ligament (plantar calcaneonavicular ligament), long and short plantar ligaments, interosseous ligaments. DYNAMIC support: TIBIALIS POSTERIOR is the PRIMARY DYNAMIC ARCH SUPPORTER — it inserts into the navicular and multiple tarsal bones via a 'fan-like' insertion, providing active inversion and plantarflexion that lifts and supports the arch. Dysfunction of the tibialis posterior tendon (PTTD — posterior tibial tendon dysfunction) = PROGRESSIVE FLAT FOOT DEFORMITY (adult-acquired flatfoot). Tests for PTTD: single-leg heel raise (inability = positive), 'too many toes' sign (too many toes visible lateral to the heel from behind). Fibularis longus EVERTS the foot (opposes arch support).

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145. The 'meniscofemoral ligaments' (Humphrey's and Wrisberg's) connect:

A. The medial meniscus to the tibial plateau

B. The LATERAL meniscus to the medial femoral condyle — passing anterior (Humphrey's) or posterior (Wrisberg's) to the PCL

C. The ACL to the posterior horn of the lateral meniscus

D. The popliteus to the lateral meniscus

✓ **Answer: B**

💡 **Rationale & Explanation:**

Meniscofemoral ligaments: two small ligaments connecting the POSTERIOR HORN of the LATERAL MENISCUS to the MEDIAL FEMORAL CONDYLE, passing in relation to the PCL: HUMPHREY'S LIGAMENT: passes ANTERIOR to the PCL. WRISBERG'S LIGAMENT: passes POSTERIOR to the PCL. These ligaments are present in ~70% of individuals. Clinical significance: they can be mistaken for the PCL on MRI; in lateral meniscal tears, they may be the only remaining attachment of the posterior horn; in PCL reconstruction, they must be identified and preserved. Their function may be to retract the lateral

meniscus posteriorly during knee extension to prevent impingement. Advanced anatomy concept that appears in upper-level PT board examinations.

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146. **The 'coracohumeral ligament' of the shoulder primarily limits:**

A. Shoulder abduction

B. External rotation and inferior translation of the humeral head — particularly when the arm is adducted and in neutral rotation

C. Shoulder flexion

D. Internal rotation

✓ Answer: B

💡 **Rationale & Explanation:**

Coracohumeral ligament (CHL): runs from the base of the coracoid process to the greater and lesser tubercles of the humerus. Primary function: limits INFERIOR TRANSLATION of the humeral head (holds the head up when the arm is at the side), and limits EXTERNAL ROTATION particularly in adduction. The CHL is one of the most important static stabilizers of the dependent shoulder (arm hanging at side). In ADHESIVE CAPSULITIS (frozen shoulder): the CHL is one of the PRIMARY sites of contracture — it thickens and fibroses, causing the characteristic loss of external rotation (especially in adduction). PT treatment targeting the CHL: stretching in adduction + ER, grade III mobilizations in ER direction, and progressive capsular mobilizations.

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147. **The 'cruciate ligaments' are named for their:**

A. Position — they are central to the knee

B. The pattern they form — they CROSS each other forming an X (Latin: crux = cross)

C. Their creator — a surgeon named Cruciate

D. Their function — they 'crucially' stabilize the knee

✓ Answer: B

💡 **Rationale & Explanation:**

The cruciate ligaments (ACL and PCL) are named because they CROSS EACH OTHER — like a cross or X (Latin 'crux' = cross). Looking at the knee from the front: the ACL runs from the ANTERIOR tibial surface UPWARD and LATERALLY to the POSTERIOR lateral femoral condyle. The PCL runs from the POSTERIOR tibial surface UPWARD and MEDIALLY to the ANTERIOR medial femoral condyle. They cross in the middle. This arrangement allows the knee to flex, extend, and rotate while providing anteroposterior stability at all angles of flexion. The crossing pattern also means that combined rotational forces can stress both ligaments simultaneously — as seen in complex multi-ligament injuries.

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148. **The 'thenar eminence' is innervated by which nerve?**

A. Ulnar nerve

B. Median nerve — the recurrent motor branch innervates the thenar muscles (abductor pollicis brevis, opponens pollicis, flexor pollicis brevis — superficial head)

C. Radial nerve

D. Anterior interosseous nerve

✓ Answer: B

💡 **Rationale & Explanation:**

Thenar muscles and innervation: The THENAR EMINENCE contains: Abductor Pollicis Brevis (APB), Opponens Pollicis (OP), Flexor Pollicis Brevis (FPB — superficial head), and 1st Lumbrical — all innervated by the RECURRENT MOTOR BRANCH of the MEDIAN NERVE. The recurrent branch loops around the flexor retinaculum at the distal edge of the carpal tunnel. In severe CTS: this branch is compressed → THENAR ATROPHY (wasting of the thenar muscles, difficulty opposing the thumb). The HYPOTHENAR eminence (abductor digiti minimi, opponens digiti minimi, flexor digiti minimi) = ULNAR NERVE. Memory: 'Median = Middle = Thumb (thenar) side'; 'Ulnar = Ulnar (little finger, hypothenar) side.'

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149. **Spinal cord 'dermatomal' level for the thumb is:**

A. C5

B. C6

C. C7

D. C8

✓ Answer: B

💡 Rationale & Explanation:

Cervical dermatomal map: C4 = top of shoulder (cape area); C5 = lateral arm (deltoid patch, lateral elbow); C6 = THUMB, index finger, radial forearm; C7 = MIDDLE FINGER, dorsum of hand; C8 = LITTLE FINGER, ulnar forearm; T1 = medial arm, medial elbow. Memory for C6-C7-C8: 'C6 = 6 letters in 'THUMB' (no, 5) — think C6 = 1st and 2nd fingers; C7 = 3rd finger (middle); C8 = 4th and 5th fingers.' Clinical: numbness in the THUMB = C6 nerve root problem (L3-L4 disc herniation at most common = C5-C6 or C6-C7 levels). Numbness in MIDDLE FINGER = C7. Numbness in LITTLE FINGER = C8/T1 (ulnar distribution). These dermatomal levels are absolutely essential for cervical radiculopathy assessment on the PRC boards.

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150. The 'iliofemoral ligament' (Y-ligament of Bigelow) is the:

A. Weakest ligament of the hip

B. STRONGEST ligament in the human body — it limits hip extension and external rotation

C. Posterior stabilizer of the hip joint

D. Ligament damaged in posterior hip dislocation

✓ Answer: B

💡 Rationale & Explanation:

Iliofemoral ligament (Y-ligament of Bigelow): the STRONGEST LIGAMENT in the human body. It runs from the ANTERIOR INFERIOR ILIAC SPINE (AIIS) and acetabular rim to the INTERTROCHANTERIC LINE of the femur — shaped like an inverted 'Y'. Primary function: LIMITS HIP EXTENSION (prevents the pelvis from falling backward when standing) and external rotation. In erect standing, the iliofemoral ligament is TAUT — this is why standing requires minimal hip flexor

muscle activity (the ligament 'locks' the hip). It's extremely strong — rarely tears in isolation. In posterior hip dislocation: the posterior capsule and other ligaments fail first. In total hip arthroplasty posterior approach: the posterior capsule is cut — the iliofemoral ligament integrity contributes to preventing anterior dislocation post-operatively.

├─ PHYSIOLOGY

151. The 'respiratory quotient' (RQ) reflects:

A. Blood oxygen saturation

B. The ratio of CO_2 produced to O_2 consumed — indicating which fuel is being metabolized (RQ=1.0 for carbohydrates, ~0.7 for fats, ~0.8 for protein)

C. Heart rate during exercise

D. Lung capacity

✓ Answer: B

💡 **Rationale & Explanation:**

Respiratory Quotient (RQ) = VCO_2 / VO_2. Interpretations: CARBOHYDRATE metabolism: $C_6H_{12}O_6 + 6O_2 \rightarrow 6CO_2 + 6H_2O$ → RQ = $6CO_2/6O_2$ = 1.0. FAT metabolism: produces more CO_2 per O_2 used → RQ ≈ 0.70 (e.g., palmitic acid). PROTEIN: RQ ≈ 0.80. In practice: RQ at REST ≈ 0.85 (mixed fuel). DURING INTENSE EXERCISE: RQ rises above 1.0 because: excess CO_2 is blown off as lactate is buffered → 'apparent RQ' >1.0. When RQ exceeds 1.0 during exercise, this indicates the VENTILATORY THRESHOLD has been crossed (anaerobic metabolism predominating). Used in indirect calorimetry and metabolic cart studies in clinical research and hospital nutrition assessment.

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152. Which lung volume CANNOT be measured by simple spirometry?

A. Tidal volume (TV)

B. Residual volume (RV) — requires gas dilution or body plethysmography techniques

C. Inspiratory reserve volume (IRV)

D. Expiratory reserve volume (ERV)

✓ Answer: B

💡 **Rationale & Explanation:**

Spirometry measures EXHALED and INHALED air — but RESIDUAL VOLUME (the air that remains in the lungs after maximal exhalation) CANNOT be breathed out and therefore CANNOT be measured by spirometry. Measuring RV requires special techniques: helium dilution, nitrogen washout, or body plethysmography. FUNCTIONAL RESIDUAL CAPACITY (FRC) = ERV + RV — also cannot be directly measured by spirometry. TOTAL LUNG CAPACITY (TLC) = all compartments including RV — cannot be measured without knowing RV. In COPD: RV and FRC INCREASE (air trapping, hyperinflation) → barrel chest. In pulmonary fibrosis: RV and TLC DECREASE (restrictive pattern). Spirometry CAN measure: TV, IRV, ERV, FVC, FEV1, FEV1/FVC ratio — all involving moving air.

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153. The term 'VO2max' represents:

A. Maximum voluntary oxygen intake during testing only

B. The maximum rate of oxygen consumption that can be achieved during exhaustive aerobic exercise — the gold standard of cardiorespiratory fitness

C. The minimum oxygen required for survival

D. Maximum CO2 output

✓ Answer: B

💡 **Rationale & Explanation:**

VO2max (maximal oxygen uptake): the highest rate of O2 consumption achievable during exhaustive maximal aerobic exercise. Units: mL/kg/min (normalized for body weight). Norms: sedentary adults 30-40 mL/kg/min; recreational athletes 45-55; elite endurance athletes 65-80+. VO2max is determined by the FICK equation: VO2max =

HRmax × SVmax × (a-vO2 diff)max. The primary limiter = CARDIAC OUTPUT (in healthy individuals). How to measure: graded exercise test (Bruce protocol, cycle ergometer) with expired gas analysis. How to estimate: 6MWT correlation, VO2max prediction equations, submaximal exercise tests (Astrand nomogram). Clinical significance: VO2max < 18 mL/kg/min = high surgical risk, poor prognosis in heart failure. Exercise training increases VO2max by 10-30%.

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154. Lactic acid (lactate) production during intense exercise is:

A. Always harmful and should be avoided

B. A normal metabolic byproduct of anaerobic glycolysis — also a fuel substrate that can be shuttled to other muscles and the liver (Cori cycle) for energy production

C. Caused by oxygen toxicity

D. Related to vitamin deficiency

✓ Answer: B

💡 **Rationale & Explanation:**

Lactate: produced in muscles during high-intensity exercise when glycolysis rate exceeds the mitochondria's capacity for oxidative phosphorylation. Previously thought to be purely waste — now understood as: FUEL: can be taken up by cardiac muscle, slow-twitch fibers, and liver for energy production (lactate shuttle hypothesis — Brooks). SIGNALING MOLECULE: involved in cell signaling, gene expression. The burning sensation during intense exercise = NOT lactic acid itself (lactate is not painful) but rather the H+ ions produced simultaneously from ATP hydrolysis → lowering pH → inhibiting contractile proteins and glycolytic enzymes. In PT, understanding lactate helps explain: interval training benefits (raises lactate threshold), why HIIT improves performance, and metabolic adaptation to training.

---

155. The 'fight or flight' response activates which division of the autonomic nervous system?

A. Parasympathetic (rest and digest)

B. Sympathetic — releasing epinephrine and norepinephrine, causing increased HR, BP, cardiac output, blood glucose, and blood flow to muscles

C. Somatic nervous system only

D. Enteric nervous system

✓ Answer: B

💡 **Rationale & Explanation:**

Sympathetic nervous system (SNS) — 'fight or flight': ADRENAL MEDULLA releases EPINEPHRINE (adrenaline) and NOREPINEPHRINE (noradrenaline) into circulation. Effects: HR ↑, stroke volume ↑, BP ↑, bronchodilation ↑ (more O2 in), blood glucose ↑ (glycogen breakdown), blood flow REDIRECTED to muscles and heart, pupils dilate, sweating ↑. The PARASYMPATHETIC system ('rest and digest'): reduces HR, promotes digestion, pupil constriction, gland secretion. CLINICAL: in exercise, the SNS is progressively activated as intensity increases. In autonomic dysreflexia (above T6 SCI): UNCONTROLLED sympathetic discharge causes dangerously high BP — a medical emergency. Understanding autonomic physiology is essential for cardiopulmonary PT and SCI management.

├— KINESIOLOGY

156. In gait, 'foot clearance' during the swing phase is primarily achieved by:

A. Hip extension only

B. A combination of ANKLE DORSIFLEXION, knee flexion (to shorten the limb), and hip flexion

C. Toe flexion

D. Calf muscle contraction

✓ Answer: B

💡 **Rationale & Explanation:**

Foot clearance during swing: For the foot to clear the ground during the swing phase, the effective limb length must be SHORTENED. This is achieved by a coordinated combination: ANKLE DORSIFLEXION (tibialis anterior lifts the foot); KNEE FLEXION (dramatically shortens the leg — loss of 1 cm of knee flexion = significantly reduced clearance); HIP FLEXION (advances and slightly shortens the limb). If ANY of these fail, the foot drags: Tibialis anterior weakness (foot drop) → ankle fails to dorsiflex → STEPPAGE GAIT (hip hikes to compensate), CIRCUMDUCTION GAIT, or VAULTING. Knee flexion limitation (post-TKA, quadriceps weakness, spasticity in extension) → STIFF KNEE GAIT (circumduction or hip hiking to compensate). Understanding clearance mechanisms guides gait analysis and rehabilitation.

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157. 'Passive insufficiency' of a two-joint muscle occurs when:

A. The muscle is actively stretched beyond its optimal length

B. The muscle is PASSIVELY LENGTHENED over both joints simultaneously until it reaches its maximum passive length — limiting further joint motion

C. The muscle is too short to contract

D. Active force production reaches zero

✓ Answer: B

💡 **Rationale & Explanation:**

Passive insufficiency: when a biarticular (two-joint) muscle is passively LENGTHENED over BOTH joints it crosses simultaneously, it reaches its maximum passive length and becomes 'passively insufficient' — preventing further motion. Example: hamstrings passive insufficiency — if you flex the hip fully (stretches the hamstrings proximally) while trying to extend the knee (stretches the hamstrings distally), the hamstrings reach maximum passive length → you cannot achieve full hip flexion AND full knee extension simultaneously. This is why the SLR test (hip flexion with knee extended) is limited by hamstring tightness. Compare: ACTIVE INSUFFICIENCY — when a biarticular muscle is shortened over BOTH joints simultaneously, it becomes too short to develop tension.

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158. **The 'windlass mechanism' of the foot is activated by:**

A. Heel strike

B. Toe DORSIFLEXION (especially the hallux) during push-off, which tightens the plantar fascia and raises the medial longitudinal arch — converting the foot into a rigid lever for propulsion

C. Ankle plantarflexion only

D. Midstance weight bearing

✓ Answer: B

💡 **Rationale & Explanation:**

Windlass mechanism (Hicks, 1954): during TERMINAL STANCE and PRE-SWING, the toes (especially the hallux) dorsiflex as the heel rises. This dorsiflexion wraps the plantar fascia around the metatarsal heads — like winding a windlass (a winch). The effect: the plantar fascia TIGHTENS, ELEVATING the medial longitudinal arch and STIFFENING the foot. This transforms the foot from a flexible shock absorber (at loading) to a RIGID LEVER for push-off. Clinical: in hallux rigidus (limited 1st MTP dorsiflexion), the windlass mechanism fails → poor push-off, altered gait, increased stress on the plantar fascia. Plantar fasciitis can be worsened by windlass loading at push-off. Understanding this mechanism is crucial for orthotics design and plantar fasciitis rehabilitation.

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159. **Hip extension during normal gait (terminal stance/push-off) is generated primarily by:**

A. Hip extensors actively contracting

B. Hip FLEXOR ECCENTRICS decelerating the advancing pelvis — the hip flexors (particularly the iliopsoas) eccentrically contract to control forward lean, AND the trail limb passive hip extension occurs as the center of mass advances over the lead foot — the gastrocnemius-soleus complex provides the primary push-off force

C. Hamstrings only

D. Tibialis anterior muscle

✓ Answer: B

💡 **Rationale & Explanation:**

Gait terminal stance force generation: This is a nuanced but important concept. During terminal stance to pre-swing, the PRIMARY PUSH-OFF FORCE comes from the GASTROCNEMIUS-SOLEUS (plantar flexors), not the hip extensors. The 'hip extension' in terminal stance is largely PASSIVE — the center of mass moves over and past the leading limb, creating relative hip extension by geometry, with the iliopsoas (hip flexor) eccentrically restraining the rate of forward progression. True active hip extension (gluteus maximus, hamstrings) is more important during the LOADING RESPONSE to decelerate the swinging limb. This explains why even patients with significant hip extensor weakness may maintain some gait — the gastrocnemius generates push-off force even without active hip extension at terminal stance.

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160. The 'Thomas test' positive for the iliopsoas (not rectus femoris) is identified when:

A. The knee flexes during testing

B. The HIP of the test leg rises off the table (cannot lie flat) while the knee remains near neutral — without the knee bending further

C. The leg abducts during lowering

D. Bilateral hip tightness prevents testing

✓ Answer: B

💡 **Rationale & Explanation:**

Thomas test differentiation: ILIOPSOAS tightness: when the test leg is lowered, the hip RISES (hip flexion contracture — the entire leg stays elevated, knee near straight or normal position). The tightness is at the HIP. RECTUS FEMORIS tightness: the hip may lower to the table, but the KNEE EXTENDS (the knee flexion angle decreases, opening up) — this is because the rectus femoris is tight across BOTH hip AND knee. If you push the knee into flexion while the hip is in the flat position and it 'springs back' = tight rectus femoris. COMBINED tightness: both the hip rises AND the knee extends. This distinction guides specific stretching: isolated hip flexor stretch vs. rectus femoris stretch (kneeling with knee bent and hip extended).

PATHOLOGY

161. Which test is used to screen for vertebral artery insufficiency (VAI) before cervical manipulation?

A. Lachman test

B. Sharp-Purser test

C. Vertebral artery test (modified Wallenberg test / cervical quadrant position)

D. Valsalva maneuver

✓ Answer: C

💡 Rationale & Explanation:

Pre-manipulation vertebral artery screening: historically, the 'vertebral artery test' (sustained end-range cervical extension + rotation, or the DeKleyn position) was used to screen for vertebrobasilar insufficiency (VBI). HOWEVER: current evidence shows these pre-test screening tests have POOR SENSITIVITY and SPECIFICITY for predicting VBI complications — a negative test does NOT reliably rule out risk. Current best practice: THOROUGH CLINICAL HISTORY for VBI risk factors (dizziness with neck movement, 5 D's: Dizziness, Diplopia, Drop attacks, Dysarthria, Dysphagia); rule out contraindications; use the lowest-risk technique; informed consent. The Sharp-Purser test screens for atlantoaxial instability (RA), not vertebral artery. Know both tests, but also know the limitations of VBI screening.

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162. The 'Spurling's cluster' for cervical radiculopathy has the HIGHEST specificity with:

A. Spurling's test alone

B. 4 positive tests: Spurling's + distraction test relieves pain + ULTT positive + ipsilateral cervical rotation <60°

C. McMurray test positive

D. Straight leg raise positive

✓ **Answer: B**

💡 **Rationale & Explanation:**

Wainner's cervical radiculopathy cluster (2003): combining 4 positive tests produces a post-test probability of ~99% for cervical radiculopathy: 1) SPURLING'S TEST positive; 2) DISTRACTION TEST positive (arm pain relieved by traction); 3) UPPER LIMB TENSION TEST (ULTT-A) positive; 4) IPSILATERAL CERVICAL ROTATION <60°. If 3/4 are positive: positive likelihood ratio = 6.1. If 4/4 are positive: LR+ = 30.3 (~99% post-test probability). This clinical prediction cluster is one of the most validated in musculoskeletal PT and demonstrates the power of combining multiple tests (diagnostic cluster) rather than relying on any single test. The PRC boards increasingly test knowledge of diagnostic accuracy and clinical prediction rules.

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163. 'Spondylolysis' is defined as:

A. Forward slippage of one vertebra on another

B. A STRESS FRACTURE or defect in the PARS INTERARTICULARIS of a vertebral arch — most commonly at L5

C. Disc degeneration at multiple levels

D. Osteoarthritis of the facet joints

✓ **Answer: B**

💡 **Rationale & Explanation:**

Spondylolysis: a structural defect (stress fracture or bony dysplasia) in the PARS INTERARTICULARIS — the narrow bridge of bone connecting the superior and inferior articular processes of a vertebra. L5 (80-90% of cases). Mechanism: repetitive hyperextension loading (gymnasts, football linemen, divers, ballet dancers). Single spondylolysis may be asymptomatic or cause LBP with extension. BILATERAL spondylolysis + forward slippage = SPONDYLOLISTHESIS. Diagnosis: Oblique X-ray shows 'Scottie dog with a collar' (the lucent defect through the pars looks like a collar on the Scottie dog neck). CT is most sensitive for acute stress fracture; SPECT scan shows activity in healing fractures. PT: core stabilization in neutral position, avoid hyperextension, bracing for acute fractures.

164. In the context of 'red flags' for low back pain, which finding most urgently requires immediate physician referral?

A. Morning stiffness in young adults

B. Saddle anesthesia + bilateral leg weakness + bowel/bladder dysfunction (possible cauda equina syndrome)

C. Back pain worse with prolonged sitting

D. Occasional referred pain to the buttock

✓ Answer: B

💡 **Rationale & Explanation:**

CAUDA EQUINA SYNDROME — the most urgent LBP red flag requiring SAME-DAY emergency referral (or 999/ER call if symptoms are acute and severe). Cauda equina compression: below L1-L2, compresses the nerve roots of the cauda equina. Red flag signs: SADDLE ANESTHESIA (numbness in perineum, inner thighs); BILATERAL leg weakness or numbness; BOWEL DYSFUNCTION (retention or incontinence); BLADDER DYSFUNCTION (retention = most common early sign, overflow incontinence); Reduced anal tone. This is a NEUROSURGICAL EMERGENCY — decompression must occur within 24-48 hours to prevent permanent bowel/bladder paralysis. EVERY PT evaluating LBP MUST screen for these findings at every assessment. No other LBP condition requires more urgent action.

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165. The 'PRICE' protocol applies to acute injuries. The 'I' (ice/cryotherapy) in PRICE is contraindicated in:

A. Acute muscle strains

B. Acute ligament sprains

C. Peripheral vascular disease, Raynaud's phenomenon, or cold allergy

D. Post-surgical joints

✓ Answer: C

💡 **Rationale & Explanation:**

ICE contraindications: PERIPHERAL VASCULAR DISEASE (reduced circulation — cold can cause tissue ischemia and necrosis in already

compromised tissue); RAYNAUD'S PHENOMENON (cold triggers intense vasospasm → can cause digital ischemia); COLD URTICARIA (allergic reaction to cold — hives, potentially anaphylaxis); COLD INTOLERANCE (some patients with Sjogren's syndrome, cryoglobulinemia); OPEN WOUNDS (direct ice contact); IMPAIRED SENSATION (patient can't feel frostbite developing). Ice is INDICATED for: acute sprains, strains, contusions, post-surgical swelling, exercise-induced muscle soreness (for pain relief). In COPD and respiratory conditions: ice around the neck/chest can trigger bronchospasm in some patients. Always screen for contraindications before applying any physical modality.

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166. The primary distinguishing feature between INFLAMMATORY and MECHANICAL back pain is:

A. Pain severity — inflammatory is more severe

B. MORNING STIFFNESS lasting >30-60 minutes (inflammatory) vs. morning stiffness <30 minutes that improves with movement (mechanical)

C. Age of patient

D. The presence of osteophytes

✓ Answer: B

💡 **Rationale & Explanation:**

Inflammatory vs. mechanical back pain distinction: INFLAMMATORY LBP (e.g., ankylosing spondylitis, inflammatory arthritis): morning stiffness >30-60 minutes (can be hours); improves with ACTIVITY; worse with rest and inactivity; often wakes patient from sleep (second half of night); bilateral sacroiliac involvement; HLA-B27 positive; elevated ESR/CRP; responds to NSAIDs. MECHANICAL LBP: morning stiffness <30 minutes; WORSENS with activity; better with rest; related to specific positions or movements; normal inflammatory markers. This distinction is critical because inflammatory LBP requires rheumatological investigation and disease-modifying drugs (DMARDs), while mechanical LBP is primarily managed with PT, exercise, and lifestyle modification.

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167. A 'positive straight leg raise' (SLR) at 40° with radiating pain to below the knee and relief with ankle plantarflexion indicates:

A. Hamstring tightness only

B. Neural tension from nerve root compression — typically L4, L5, or S1 (true neurodynamic sign, not muscular restriction)

C. Tibial nerve injury

D. IT band tightness

✓ Answer: B

💡 **Rationale & Explanation:**

Positive SLR (Lasègue's test) interpretation: The TRUE positive SLR has three criteria: 1) PAIN that RADIATES below the knee (dermatomal distribution); 2) ONSET at a LOW ANGLE (typical positive: <70°, high-quality: <35-45°); 3) RELIEF with ankle PLANTARFLEXION (de-tensioning the nerve) or ADDING NECK FLEXION INCREASES symptoms (re-tensioning). Hamstring tightness: causes POSTERIOR THIGH pain/pulling sensation without true radiating leg pain. Sensitivity of SLR for disc herniation: ~75-97% (highly sensitive). Specificity: ~26-40% (less specific). So: NEGATIVE SLR = unlikely disc herniation (rules it out). POSITIVE SLR = might be disc herniation but not confirmed — need clinical correlation. Combine with neurological signs (reflexes, motor, sensory) for diagnosis.

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168. Grade III ankle sprain (complete ATFL + CFL tear) is managed by:

A. Immediate return to sport

B. PRICE + functional brace/boot → early protected weight-bearing → progressive ROM + strengthening → proprioception training — surgery rarely needed except in recurrent instability

C. Six weeks of cast immobilization for all Grade III

D. Immediate surgical repair for all Grade III

✓ Answer: B

💡 **Rationale & Explanation:**

Grade III ankle sprain (complete ligament rupture): current evidence strongly supports FUNCTIONAL CONSERVATIVE MANAGEMENT over

surgical repair and over prolonged cast immobilization. Evidence shows equal or superior outcomes with: 1) PRICE initially (24-72 hours) for pain and swelling control; 2) FUNCTIONAL BRACE or SEMI-RIGID ANKLE ORTHOSIS — provides proprioceptive feedback and limits inversion without rigid immobilization; 3) EARLY PROTECTED WEIGHT-BEARING (crutches until comfortable with WB); 4) Progressive ROM exercises (dorsiflexion, eversion strengthening); 5) PROPRIOCEPTION TRAINING (crucial — single-leg balance, wobble board, perturbation); 6) Progressive SPORT-SPECIFIC training. Surgery (ligament reconstruction — Broström procedure) is reserved for RECURRENT INSTABILITY after failed conservative management.

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169. The most common cause of a 'trigger finger' (stenosing tenosynovitis) is:

A. Nerve compression

B. NARROWING OF THE A1 PULLEY at the MCP joint, causing the flexor tendon to catch and lock as it passes through — the finger gets stuck in flexion and snaps open (triggering)

C. Extensor tendon tear

D. Lumbrical muscle spasm

✓ Answer: B

💡 Rationale & Explanation:

Trigger finger (stenosing tenosynovitis): the A1 PULLEY (at the base of the proximal phalanx, at the MCP joint level) thickens and narrows. The FLEXOR TENDON develops a nodular swelling that is larger than the narrowed pulley — as the finger flexes, the tendon 'snaps' through the narrowed pulley with difficulty; when releasing, it catches or locks in flexion. The patient may need to manually straighten the finger (PIP joint). Thumb = trigger THUMB. Treatment: corticosteroid injection into the tendon sheath (>50% success), splinting PIP in extension, PT for steroid injection guidance; surgical A1 pulley release for refractory cases. Risk factors: diabetes mellitus (most common in diabetic patients), rheumatoid arthritis, hypothyroidism, repetitive gripping.

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170. The 'diagnostic criteria' for complex regional pain syndrome (CRPS) include (Budapest Criteria):

A. Joint swelling and morning stiffness only

B. Continuous pain disproportionate to the inciting event PLUS signs/symptoms from at least 3 of 4 categories: sensory (hyperalgesia/allodynia), vasomotor (temperature/skin color asymmetry), sudomotor/edema (swelling/sweating), motor/trophic (decreased ROM, tremor, hair/nail changes)

C. Elevated ESR and CRP

D. Positive MRI findings only

✓ Answer: B

💡 **Rationale & Explanation:**

CRPS Budapest Criteria (2003): Diagnosis requires: 1) Continuous pain disproportionate to any inciting event; 2) Patient reports symptoms from ≥3 of 4 categories: SENSORY (allodynia — pain with light touch; hyperalgesia — increased pain to painful stimulus); VASOMOTOR (temperature asymmetry >1°C; skin color asymmetry — red/purple/pale); SUDOMOTOR/EDEMA (sweating asymmetry; edema); MOTOR/TROPHIC (decreased ROM; tremor/dystonia; hair growth changes; nail changes; skin atrophy). 3) Clinician finds signs from ≥2 of 4 categories. 4) No other diagnosis better explains the signs and symptoms. CRPS I = no identifiable nerve injury; CRPS II = identifiable nerve injury. Treatment: physiotherapy (desensitization, graded motor imagery, mirror therapy, progressive loading), pain neuroscience education, multidisciplinary approach.

PHYSIOLOGY

171. Which of the following BEST describes 'arteriosclerosis'?

A. Inflammation of arteries

B. HARDENING AND LOSS OF ELASTICITY of arterial walls due to age-related calcification, collagen deposition, and smooth muscle changes

— increasing systolic BP and cardiac workload

C. Blood clot formation in arteries

D. Vasodilation of peripheral arteries

✓ Answer: B

💡 **Rationale & Explanation:**

Arteriosclerosis (literally 'hardening of arteries'): an umbrella term for any thickening and hardening of arterial walls. Types: ATHEROSCLEROSIS (most common — plaque formation in medium/large arteries from lipid deposition, foam cells, calcification); ARTERIOSCLEROSIS OBLITERANS (peripheral arterial disease — small/medium arteries); MONCKEBERG'S ARTERIOSCLEROSIS (calcification of tunica media without plaque). Consequences: reduced vessel elasticity → INCREASED PULSE PRESSURE (wider gap between systolic and diastolic), increased cardiac workload; reduced coronary and peripheral blood flow; increased stroke and MI risk. In PT: arteriosclerotic peripheral arterial disease causes claudication (calf pain with walking, relieved by rest). Ankle-brachial index (ABI) screening is important before applying compression to the lower extremities.

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172. The 'Frank-Starling law' in cardiac physiology: the clinical condition in which this mechanism fails is:

A. Hypertension

B. HEART FAILURE — the Frank-Starling curve is shifted DOWNWARD, so for the same preload (end-diastolic volume), the failing heart produces a LOWER stroke volume than normal

C. Anemia

D. Atrial fibrillation

✓ Answer: B

💡 **Rationale & Explanation:**

Frank-Starling in heart failure: in the NORMAL heart, increased filling (preload) → increased stretch → increased contractility → increased stroke volume (upward-sloping Frank-Starling curve). In HEART

FAILURE: the curve is DEPRESSED — at the same EDV (same preload), the failing heart generates LESS stroke volume. As heart failure worsens, the patient may be on the 'flat' part of the failing curve — further increases in preload no longer increase CO and may cause pulmonary edema. Treatment: diuretics reduce preload; ACE inhibitors reduce afterload; inotropes increase contractility (move to a higher curve). PT implications: exercise training in heart failure carefully manages preload through proper warm-up, exercise intensity, and cool-down — preventing acute hemodynamic overload while building long-term cardiac adaptation.

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173. The normal 'ankle-brachial index' (ABI) in a healthy individual is:

A. 0.5-0.7

B. 0.9-1.3 (ABI of 1.0 = equal ankle and brachial pressure)

C. 1.5-2.0

D. 0.3-0.5

✓ Answer: B

💡 **Rationale & Explanation:**

Ankle-Brachial Index (ABI) = Ankle systolic BP / Brachial (arm) systolic BP. NORMAL: 0.9-1.3 (ankle pressure should be equal to or slightly higher than arm pressure because of wave reflection in distal vessels). INTERPRETATION: >1.3 = calcified vessels (non-compressible — common in diabetes — falsely elevated); 0.9-1.0 = borderline, mild disease; 0.7-0.89 = mild PAD; 0.4-0.69 = moderate PAD (claudication); <0.4 = severe PAD (rest pain, limb-threatening ischemia). PT relevance: BEFORE applying compression bandaging to the lower extremity (for edema, lymphedema, venous ulcers): ALWAYS measure ABI. If ABI <0.8: compression may worsen arterial insufficiency → CONTRAINDICATED without physician consultation. ABI <0.5 = SEVERE arterial disease — DO NOT compress.

KINESIOLOGY

174. In the analysis of a 'deep squat', the limiting factor in most untrained individuals is:

A. Knee extensor weakness

B. LIMITED ANKLE DORSIFLEXION — insufficient dorsiflexion forces the heel to lift, trunk to lean excessively forward, and/or the knee to translate medially (valgus collapse)

C. Hip abductor weakness only

D. Lumbar flexion inability

✓ Answer: B

💡 **Rationale & Explanation:**

Deep squat limiting factors: To achieve a full-depth squat (thighs parallel or below), the ankle must achieve at least 35-40° of dorsiflexion in a closed-chain position. Most untrained individuals lack this range (particularly after prolonged sitting with shortened Achilles complex). Limited DF consequences: HEEL RISE (shifts weight forward); EXCESSIVE FORWARD TRUNK LEAN (increases lumbar extension stress); KNEE VALGUS (the body tries to distribute the load by rotating — increases ACL and patellofemoral stress). Assessment: weight-bearing dorsiflexion test (lunge test: knee-to-wall distance). Treatment: gastrocnemius-soleus stretching, dorsiflexion joint mobilization, ankle mobility exercises. Adequate ankle DF is prerequisite for safe deep squatting — relevant to ACL prevention programs and weightlifting rehabilitation.

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175. The gait deviation 'antalgic gait' is characterized by:

A. Shortened stride length on the UNAFFECTED side

B. SHORTENED STANCE PHASE on the PAINFUL (affected) side — the patient minimizes time bearing weight on the painful limb, creating an asymmetric, limping gait pattern

C. Increased cadence throughout

D. Bilateral hip hiking

✓ Answer: B

💡 **Rationale & Explanation:**

Antalgic gait: 'antalgic' means pain-relieving. Mechanism: the patient SHORTENS THE STANCE PHASE on the PAINFUL side — spending less time bearing weight on the hurting limb. The gait becomes ASYMMETRIC: shortened step length from the painful side (less time = shorter step), longer step from the sound side. The overall cadence is often reduced (walking more slowly). Compare: TRENDELENBURG GAIT = lateral trunk lean toward the weak hip abductor side; ANTALIC GAIT = shortened stance on PAINFUL side; STEPPAGE GAIT = high step to clear a dropped foot; SCISSOR GAIT = hip adductor spasticity causing crossed gait pattern. Identifying the SPECIFIC gait deviation helps localize the pathology and guide PT assessment.

PATHOLOGY

176. The 'RICES' expanded protocol (replacing PRICE) added which step?

A. Surgery

B. STABILIZATION or SUPPORT as the 'S' — using elastic bandaging, taping, or a brace to stabilize the injured joint in a functional position while healing

C. Stretching

D. Strengthening exercises

✓ Answer: B

💡 **Rationale & Explanation:**

RICES protocol: Rest, Ice, Compression, Elevation, Support/Stabilization. The 'S' — STABILIZATION OR SUPPORT — was added to recognize that injured joints (particularly ankles, knees, wrists) benefit from external stabilization to: 1) Protect the healing ligaments from further stress; 2) Reduce pain (joint is held in a comfortable position); 3) Facilitate early functional weight-bearing (semi-rigid ankle brace allows WB with injury protection); 4) Provide proprioceptive feedback (the brace stimulates skin mechanoreceptors). Modern approaches: PEACE & LOVE (2019) — Protection, Elevation, Avoid anti-inflammatories, Compression,

Education; followed by Load, Optimism, Vascularization, Exercise. Regardless of the acronym used, the PRINCIPLES remain: protect, control swelling, early loading, and progressive rehabilitation.

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177. The 'biopsychosocial model' of musculoskeletal pain proposes:

A. Pain is purely a physical phenomenon

B. Pain results from a complex interaction of BIOLOGICAL (tissue damage, nociception), PSYCHOLOGICAL (fear, catastrophizing, expectations, mood), and SOCIAL (work, relationships, culture, socioeconomic) factors

C. Pain is only psychological

D. Biological factors are irrelevant once an injury heals

✓ Answer: B

💡 **Rationale & Explanation:**

Biopsychosocial model (Engel, 1977): replaced the purely biomedical model for pain and disability. BIOLOGICAL: nociception, tissue damage, inflammation, nerve sensitization. PSYCHOLOGICAL: pain catastrophizing, kinesiophobia, depression, anxiety, expectations, beliefs about pain, prior pain experiences. SOCIAL: work environment, compensation/litigation status, social support, cultural beliefs about pain, socioeconomic factors. ALL THREE interact: the same injury (biological) can produce very different disability depending on the patient's psychological state and social environment. In PT: the biopsychosocial model underpins: pain neuroscience education (PNE), psychologically informed PT, yellow flag screening (STarT Back Tool, Örebro MSK Pain Questionnaire), graded exposure therapy. A PT who only treats the 'body' and ignores psychology and social context will achieve suboptimal outcomes in complex chronic pain cases.

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178. Yellow flags in musculoskeletal physiotherapy indicate:

A. Serious pathology requiring immediate referral

B. PSYCHOSOCIAL RISK FACTORS for chronicity and disability — poor recovery predictors including catastrophizing, fear-avoidance, low mood, unhelpful beliefs, poor work relationship, depression

C. Vascular complications

D. Systemic infection

✓ **Answer: B**

💡 **Rationale & Explanation:**

Yellow flags (Kendall et al.): psychosocial factors associated with POOR RECOVERY PROGNOSIS and transition from acute to CHRONIC musculoskeletal pain/disability. Categories (using the ABCDEFW acronym): A = Attitudes (pain is harmful, rest is essential, passive treatment preferred); B = Behavior (excessive rest, activity avoidance, pain checking behaviors); C = Compensation (involvement in compensation systems, financial incentive for disability); D = Diagnosis/treatment (medical diagnoses focused on pathology, conflicting advice); E = Emotions (depression, anxiety, high stress, fear of re-injury); F = Family (overprotective partner, family reinforcing disability); W = Work (heavy physical work, unsupportive employer, low job satisfaction). Yellow flags require PSYCHOLOGICALLY INFORMED PT — addressing beliefs, behaviors, and emotional factors alongside physical treatment.

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179. The primary pathological mechanism of NECK PAIN after whiplash injury is:

A. Disc herniation in all cases

B. Soft tissue injury to the cervical muscles, ligaments, and zygapophyseal joints — with central sensitization contributing to chronicity in a subset of patients

C. Fracture of the odontoid process

D. Carotid artery dissection

✓ **Answer: B**

💡 **Rationale & Explanation:**

Whiplash mechanism (most common — WAD I-II): rapid acceleration-deceleration of the head relative to the trunk. Primary tissue injuries: ZYGAPOPHYSEAL (facet) JOINT INJURY (most common pain generator in chronic WAD — C2-C3 and C5-C6 levels most affected); CERVICAL

MUSCLE INJURIES (especially deep cervical flexors — longus colli, longus capitis — impair cervical motor control); LIGAMENTOUS injury (interspinous, capsular ligaments). DISC INJURY less common but occurs in severe WAD. CENTRAL SENSITIZATION develops in WAD III+ and chronic WAD — explaining why symptoms persist beyond tissue healing. PT for WAD: early active mobilization (not immobilization in collar), deep cervical flexor retraining, manual therapy, exercise. Prognosis: most WAD I-II resolve within 3 months with appropriate management.

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180. Which finding suggests SERIOUS PATHOLOGY (red flag) in a patient presenting with back pain?

A. Muscle spasm

B. UNEXPLAINED WEIGHT LOSS, PAIN AT REST AND NIGHT, HISTORY OF CANCER, AGE >50 with new-onset back pain — suggesting possible malignancy or spinal metastasis

C. Morning stiffness

D. Radiation to the buttock

✓ Answer: B

💡 **Rationale & Explanation:**

Back pain red flags for MALIGNANCY (SPINAL METASTASES): Age >50; History of CANCER (especially breast, prostate, lung, thyroid, kidney — most common to metastasize to spine); UNEXPLAINED WEIGHT LOSS (>4.5 kg in 6 months); Pain at NIGHT and at REST (bone metastasis pain is classically worse at rest/night — unlike mechanical LBP which is better at rest); Pain that does not change with position; THORACIC SPINE PAIN (metastases more common in thoracic spine than lumbar); Multiple prior cancer treatments. Other red flags: fracture (trauma, steroids, osteoporosis), infection (fever, IV drug use, immunocompromised), cauda equina syndrome. In Philippine PT practice: a patient with a known cancer history presenting with back pain = IMMEDIATE physician referral before PT treatment.

ANATOMY

181. The palmaris longus (PL) muscle is:

A. Always present; it flexes the wrist

B. Present in ~80-85% of the population; it is a weak wrist flexor; its tendon is harvested for ligament reconstruction surgeries

C. Always absent in females

D. The strongest wrist flexor

✓ Answer: B

💡 Rationale & Explanation:

Palmaris longus (PL): a small, vestigial wrist flexor muscle that is ABSENT in 10-20% of the population (unilaterally or bilaterally). When present: visible on the anterior forearm as a thin tendon when you oppose the thumb and little finger and flex the wrist. Clinically important as a TENDON GRAFT for ligament reconstruction (ACL reconstruction historically; hand ligament repairs; tendon transfers). The PL is innervated by the median nerve. Testing for its presence is a standard physical examination finding. In PT examination scenarios about wrist anatomy: if a patient lacks PL, they still have adequate wrist flexion from FCR and FCU.

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182. The 'anatomical position' of the hip that is the close-packed (maximum congruency) position is:

A. 30° flexion, 30° abduction, 30° ER

B. Full extension, internal rotation, and abduction

C. 90° flexion, neutral rotation

D. Full flexion only

✓ Answer: B

💡 Rationale & Explanation:

Hip close-packed position: full EXTENSION + INTERNAL ROTATION + ABDUCTION. In this position: the hip capsule is maximally taut; the femoral head is maximally congruent within the acetabulum; the

ligaments (especially the iliofemoral ligament) are fully tightened. This is the least common position in daily life — the hip is almost never in full extension + IR + abduction simultaneously. Compare with the LOOSE-PACKED (resting) position (30° flexion, 30° abduction, slight ER) — used for joint mobilization. The close-packed position concept is tested in manual therapy certification examinations and PT boards as part of joint mobilization and orthopedic examination knowledge.

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183. The 'Hunter's canal' (adductor canal or subsartorial canal) contains:

A. The femoral nerve and artery only

B. The femoral artery, femoral vein, and saphenous nerve — as the femoral artery transitions to the popliteal artery at the adductor hiatus

C. The sciatic nerve

D. The obturator artery only

✓ Answer: B

💡 **Rationale & Explanation:**

Hunter's canal (adductor canal, subsartorial canal): a fascial tunnel in the middle third of the medial thigh, running from the femoral triangle (apex) to the adductor hiatus (where the femoral artery passes to become the popliteal artery). Boundaries: medial = adductor longus and magnus; anterior = vastus medialis; posterior = sartorius (which forms the roof). Contents: FEMORAL ARTERY, FEMORAL VEIN, SAPHENOUS NERVE (sensory branch of femoral nerve), and the nerve to vastus medialis. Clinical: the adductor canal block (anesthesia) is injected here for knee surgery — blocks the saphenous nerve providing sensory anesthesia to the medial knee without motor weakness (unlike a femoral nerve block which weakens the quads). PT relevance: saphenous nerve entrapment in the adductor canal causes medial knee pain — confused with MCL injury.

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184. The 'greater trochanteric pain syndrome' (GTPS) involves pathology of:

A. The piriformis muscle only

B. The gluteus medius and minimus tendons at their insertion on the greater trochanter, and associated bursitis — causing lateral hip pain

C. The iliopsoas tendon at the lesser trochanter

D. The IT band at Gerdy's tubercle

✓ Answer: B

💡 **Rationale & Explanation:**

Greater trochanteric pain syndrome (GTPS): encompasses: GLUTEUS MEDIUS TENDINOPATHY (most common cause) and GLUTEUS MINIMUS TENDINOPATHY at their insertions on the greater trochanter; TROCHANTERIC BURSITIS (may be reactive bursitis secondary to the tendinopathy). CLINICAL: lateral hip pain, tenderness on the greater trochanter, pain lying on the affected side, pain with single-leg stance activities (walking, stairs, standing on one leg). RISK FACTORS: female sex (wider pelvis = increased hip adduction angle), ITB tightness, hip OA, hip surgery, lumbar disc disease with L4-L5 pathology (referred pain). TREATMENT: load management, progressive gluteal tendon loading (isometrics → isotonic), address contributing factors (hip adduction angle during activity, LBP, lower extremity biomechanics). AVOID: stretches that compression the tendon (hip adduction stretches — make the tendinopathy WORSE).

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185. The 'piriformis muscle' is a landmark for identifying the sciatic nerve because:

A. The sciatic nerve passes through the piriformis in all individuals

B. The sciatic nerve most commonly passes INFERIOR to the piriformis — but in 10-15% of individuals, part or all of the sciatic nerve passes THROUGH the piriformis, predisposing to piriformis syndrome

C. The piriformis protects the sciatic nerve

D. The sciatic nerve is lateral to the piriformis

✓ Answer: B

💡 **Rationale & Explanation:**

Piriformis-sciatic nerve relationship: in MOST individuals (~85%): the sciatic nerve passes BELOW (inferior to) the piriformis through the

greater sciatic foramen. In ~10-15%: there is an ANATOMICAL VARIANT where one division of the sciatic nerve (usually the peroneal division) passes THROUGH the piriformis muscle belly. This variant significantly increases the risk of PIRIFORMIS SYNDROME — compression of the sciatic nerve by the piriformis muscle, causing: deep buttock pain, sciatica-like symptoms, pain with sitting, pain with hip ER movements. The variant explains why piriformis syndrome more commonly involves the peroneal distribution (foot drop, lateral leg symptoms). PT treatment: piriformis stretching, hip external rotator stretching, manual therapy, dry needling.

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186. In the forearm, the 'interosseous membrane' primarily serves to:

A. Allow forearm rotation

B. TRANSMIT FORCE from the radius to the ulna — about 60% of forearm axial load travels from the radius (where it is received at the wrist) through the interosseous membrane to the ulna; it also maintains the relative position of the two bones during pronation/supination

C. Connect the radius to the humerus

D. Support the median nerve

✓ Answer: B

💡 Rationale & Explanation:

Interosseous membrane (IOM) of the forearm: a broad fibrous sheet connecting the radius and ulna along their interosseous borders. FUNCTIONS: 1) FORCE TRANSMISSION: distributes axial compressive force from the radius (which receives ~80% of wrist compressive load from the carpals) through its oblique fiber orientation to the ulna and ultimately to the elbow joint; 2) MAINTAINS FOREARM STRUCTURAL INTEGRITY: keeps radius and ulna in proper rotational relationship during pronation/supination; 3) PROVIDES ATTACHMENT for forearm muscles (flexor digitorum profundus, flexor pollicis longus, extensor pollicis brevis, and others). CLINICAL: IOM injury (Essex-Lopresti injury = radial head fracture + IOM disruption + distal radioulnar joint injury)

causes proximal radius migration and DRUJ instability — difficult to diagnose and treat.

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187. 'Boutonnière deformity' of the finger is characterized by:

A. DIP extension + PIP flexion (opposite of swan neck)

B. PIP FLEXION + DIP HYPEREXTENSION — caused by rupture of the central slip of the extensor digitorum tendon at its PIP insertion

C. MCP flexion + IP extension

D. Pure DIP flexion only

✓ Answer: B

💡 **Rationale & Explanation:**

Boutonnière deformity (buttonhole deformity): CENTRAL SLIP RUPTURE of the extensor mechanism at the PIP joint. When the central slip is torn: the PIP joint prolapses through the gap (like a buttonhole) → PIP FLEXION. The lateral bands migrate volar (in front of the PIP joint axis) → they paradoxically extend the DIP joint → DIP HYPEREXTENSION. Result: PIP FLEXION + DIP HYPEREXTENSION. Compare: SWAN NECK deformity = PIP HYPEREXTENSION + DIP FLEXION. Memory: Boutonnière = button/bow tie = the PIP flexion creates a 'bow tie' appearance. Causes: rheumatoid arthritis, volar PIP dislocation, traumatic central slip rupture. Treatment (acute): PIP extension splinting for 6 weeks to allow central slip healing. Late/chronic: splinting less effective, surgery may be needed.

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188. The 'rotator cuff interval' tears (subscapularis + supraspinatus combined tears) most commonly follow:

A. Repetitive overhead activity in older adults

B. ANTERIOR SHOULDER DISLOCATION — particularly the first dislocation in patients >40 years old; the combined coracohumeral ligament + rotator interval disruption causes anterior instability + rotator cuff pathology

C. Posterior shoulder instability

D. Direct lateral blow to the shoulder

✓ Answer: B

💡 **Rationale & Explanation:**

Rotator cuff tears in anterior dislocation context: in patients OVER 40 years: shoulder dislocation commonly causes ROTATOR CUFF TEARS rather than Bankart lesions (which predominate in younger patients <25 years). The SUBSCAPULARIS is particularly at risk in anterior dislocation — it is stretched or torn as the humeral head displaces anteriorly. Combined subscapularis + supraspinatus tears with anterior dislocation are common in this age group. Clinically: after reduction of the dislocation, always assess rotator cuff function (especially ER strength for infraspinatus, IR for subscapularis) and refer for ultrasound/MRI if suspected. PT post-dislocation in >40-year-olds: rotator cuff rehabilitation is the primary focus, not just joint stabilization exercises.

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189. The 'lateral epicondyle' of the humerus serves as the attachment point for the:

A. Flexor-pronator group

B. COMMON EXTENSOR ORIGIN — ECRB, extensor digitorum, extensor digiti minimi, extensor carpi ulnaris

C. Biceps brachii tendon

D. Brachialis muscle

✓ **Answer: B**

💡 **Rationale & Explanation:**

Lateral epicondyle attachments: the COMMON EXTENSOR ORIGIN attaches to the lateral epicondyle: ECRL (extensor carpi radialis longus — actually attaches to the lateral SUPRACONDYLAR RIDGE, not the epicondyle itself); ECRB (extensor carpi radialis brevis — the most commonly affected in lateral epicondylitis); Extensor digitorum communis (EDC); Extensor digiti minimi (EDM); Extensor carpi ulnaris (ECU). Compare: MEDIAL EPICONDYLE = COMMON FLEXOR ORIGIN: pronator teres, FCR, palmaris longus, FDS, FCU. 'Lateral = extensors, Medial = flexors.' Easy memory: LATERAL EPICONDYLITIS = TENNIS ELBOW = pain with wrist extension = extensor overuse; MEDIAL

EPICONDYLITIS = GOLFER'S ELBOW = pain with wrist flexion = flexor overuse.

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190. The vertebral artery travels through:

A. The neural foramina only

B. The TRANSVERSE FORAMINA (foramina transversaria) of C1-C6 vertebrae — then passes over the posterior arch of C1 and through the foramen magnum to enter the skull

C. The subarachnoid space of the cervical cord

D. The lamina of the vertebrae

✓ Answer: B

💡 **Rationale & Explanation:**

Vertebral artery course: the vertebral artery (branch of the subclavian artery) travels through the TRANSVERSE FORAMINA of C6 through C1 (it does NOT enter the spine at C7 in most individuals — it enters at C6). It then loops around the posterior arch of C1 and enters the skull through the foramen magnum. It joins the contralateral vertebral artery to form the basilar artery at the pons. Clinical PT relevance: 1) CERVICAL MANIPULATION risk: the artery is tethered as it hooks around C1 — high-velocity rotation can stretch or tear it → vertebrobasilar stroke. 2) C1-C2 INSTABILITY (RA, trauma) can compress the VA; 3) CERVICAL OSTEOPHYTES at C5-C6 can compress the VA in rotation. VBI (vertebrobasilar insufficiency) screening is mandatory before cervical manipulation.

├— PHYSIOLOGY

191. The 'sensory receptors' in the joint capsule that respond to rate of joint movement (velocity) are:

A. Ruffini endings

B. PACINIAN CORPUSCLES — rapidly adapting, respond to acceleration and high-frequency vibration; relevant for detecting rapid joint

movement

C. Free nerve endings

D. Golgi tendon organs

✓ Answer: B

💡 **Rationale & Explanation:**

Joint mechanoreceptors: TYPE I (Ruffini endings): in the joint capsule; slowly adapting; respond to STATIC JOINT POSITION and LOW-VELOCITY movement; most numerous in weight-bearing joints; important for posture and proprioception. TYPE II (Pacinian corpuscles): in the joint capsule; RAPIDLY ADAPTING; respond to ACCELERATION, rapid changes in movement; detect onset and end of movement. TYPE III (Golgi tendon organ-like): in ligaments; respond to EXTREME JOINT STRESS (protective inhibitory response). TYPE IV (free nerve endings): pain and temperature receptors; respond to noxious stimuli. In rehabilitation: after joint injury, mechanoreceptors are damaged → impaired proprioception and joint position sense. Proprioceptive training restores Type I and II receptor input through progressive joint loading and balance exercises.

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192. The 'innervation ratio' of a motor unit refers to:

A. The number of different muscles innervated by one nerve

B. The NUMBER OF MUSCLE FIBERS per MOTOR NEURON — small innervation ratio = precise fine motor control (eye muscles: 3-5 fibers/neuron); large ratio = coarse/powerful movement (gastrocnemius: 1000-2000 fibers/neuron)

C. The speed of nerve conduction

D. The diameter of the motor axon

✓ Answer: B

💡 **Rationale & Explanation:**

Innervation ratio and motor control: SMALL INNERVATION RATIO (few muscle fibers per motor neuron): enables PRECISE, FINE MOTOR CONTROL — extraocular muscles (~3-5), intrinsic hand muscles (~100-200). Each motor unit contracts a small number of fibers → small force

increments → fine graded control. LARGE INNERVATION RATIO (many muscle fibers per motor neuron): generates LARGE FORCE but COARSE CONTROL — gastrocnemius (~1700-2000), deltoid (~500-1000). Clinical relevance: MUSCLE RE-EDUCATION after nerve injury must reestablish motor unit recruitment with appropriate innervation ratios; fine motor recovery (hand intrinsics) requires much more precise neural re-education than gross motor recovery (shoulder abduction). This explains why hand function recovery is so challenging after stroke or peripheral nerve injury.

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193. **'Blood doping' and EPO abuse in athletes attempt to artificially increase:**

A. Muscle glycogen stores

B. RED BLOOD CELL COUNT AND HEMOGLOBIN — improving oxygen-carrying capacity and VO2max for endurance sports

C. Maximum heart rate

D. Muscle fiber size

✓ Answer: B

💡 **Rationale & Explanation:**

Blood doping/EPO in sport: ERYTHROPOIETIN (EPO) is a hormone produced by the kidneys that stimulates red blood cell production. Blood doping = transfusing additional red blood cells. Effect: increases RBC mass → increases blood hemoglobin → increases oxygen-carrying capacity (arterial O2 content) → increases VO2max by 5-10% → significant endurance performance advantage. HEALTH RISKS: increased blood viscosity → thrombosis risk (DVT, PE, stroke — especially when dehydrated or at night when HR is low); EPO abuse → potentially fatal polycythemia. PT relevance: understanding exercise physiology helps PTs recognize doping-related health risks in athletes they may work with; also understanding the normal adaptations of training (natural EPO increase with altitude training, training-induced improvements in red cell mass).

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194. **The 'myotatic reflex' (stretch reflex) arc includes which sequence?**

A. Muscle spindle → dorsal horn → brain → ventral horn → motor neuron → muscle

B. Muscle spindle (Ia afferent) → DIRECTLY synapses on alpha motor neuron in ventral horn (MONOSYNAPTIC) → muscle contracts

C. Golgi tendon organ → Ia afferent → alpha motor neuron → muscle

D. Free nerve endings → pain signal → withdrawal reflex

✓ Answer: B

💡 Rationale & Explanation:

Myotatic (stretch) reflex arc: The SIMPLEST and FASTEST reflex in the body — MONOSYNAPTIC (one synapse only). Sequence: 1) Muscle STRETCH activates the MUSCLE SPINDLE (the stretch receptor); 2) Ia AFFERENT FIBER conducts impulse to the spinal cord DORSAL HORN; 3) Ia fiber DIRECTLY SYNAPSES on the ALPHA MOTOR NEURON in the VENTRAL HORN (ONE SYNAPSE = monosynaptic); 4) Alpha motor neuron signal travels via efferent fiber to the SAME MUSCLE; 5) Muscle CONTRACTS. No brain involvement in the reflex arc itself (though the brain can modulate it). Clinically: deep tendon reflexes (patellar, Achilles, biceps) ARE stretch reflexes — tap the tendon → stretch the muscle spindle → monosynaptic reflex → muscle kicks. Hyperreflexia in UMN lesions results from loss of normal descending INHIBITION of this reflex arc.

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195. The 'reciprocal inhibition' neurophysiological mechanism means:

A. Agonist and antagonist contract together

B. When the AGONIST CONTRACTS, an inhibitory interneuron (Ia inhibitory interneuron) simultaneously RELAXES the ANTAGONIST muscle — allowing smooth, coordinated movement

C. Both muscles contract during reflex

D. Pain inhibits all muscle activity

✓ Answer: B

💡 Rationale & Explanation:

Reciprocal inhibition: when the muscle spindle's Ia afferent sends its excitatory signal to the agonist alpha motor neuron, it

SIMULTANEOUSLY sends a collateral branch to an INHIBITORY INTERNEURON (Ia inhibitory interneuron) in the dorsal horn. This inhibitory interneuron synapses on the ANTAGONIST alpha motor neuron → the antagonist is INHIBITED (relaxed). This is essential for smooth, coordinated movement — you can't flex the elbow efficiently if the triceps is simultaneously contracting. CLINICAL APPLICATIONS: 1) PNF TECHNIQUE (Contract-Relax-Agonist-Contract): contracting the agonist inhibits the tight antagonist through reciprocal inhibition — increasing its stretch range; 2) Assessing spasticity — the hyperactive stretch reflex of UMN lesions over-rides normal reciprocal inhibition → co-contraction of spastic agonist and antagonist; 3) Neural mobilization — limb positioning stretches the neural tissue while reciprocal inhibition reduces muscle guarding.

├─ KINESIOLOGY

196. The 'stoop test' for lumbar spinal stenosis (standing lumbar extension for 30-60 seconds) is POSITIVE when:

A. Back pain only occurs

B. The patient's LEG PAIN IS REPRODUCED with sustained extension (walking or standing) and RELIEVED by forward bending (sitting, stooping, cycling) — this pattern confirms neurogenic claudication from stenosis

C. The patient's arm pain is reproduced

D. Back pain worsens only on bending

✓ Answer: B

💡 **Rationale & Explanation:**

Stoop test (Dyck, 1979): patient walks until leg symptoms appear (neurogenic claudication); then the examiner asks the patient to STOOP FORWARD (flex the lumbar spine). POSITIVE: symptoms RELIEVE with stooping forward. Mechanism: EXTENSION narrows the spinal canal and foramen → increases nerve root compression → claudication symptoms. FLEXION widens the canal → relieves

compression → symptoms improve. This is the definitive functional test for neurogenic claudication. The 'shopping cart sign' is the spontaneous version (patients lean forward on a cart). VASCULAR claudication: leg pain with walking relieved by standing STILL (not necessarily flexion). Differentiating neurogenic from vascular claudication: neurogenic = relieved by lumbar flexion; vascular = relieved by standing still; confirmed by: ABI, MRI spine.

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197. In elbow biomechanics, the 'valgus extension overload' syndrome in overhead throwing athletes involves:

A. Pure medial epicondyle stress

B. MEDIAL TENSION (UCL stretching) + LATERAL COMPRESSION (radiocapitellar compression) + POSTERIOR IMPINGEMENT (olecranon-olecranon fossa contact) — all occurring simultaneously during the acceleration phase of throwing

C. Posterior capsule tightness only

D. Medial nerve compression only

✓ Answer: B

💡 **Rationale & Explanation:**

Valgus extension overload (VEO) in throwers: during the ACCELERATION phase of overhead throwing, the elbow generates massive VALGUS TORQUE (up to 64 Nm). This creates SIMULTANEOUSLY: MEDIAL TENSION: ulnar collateral ligament (UCL) stretched → UCL injury → the most common elbow injury in throwing athletes. LATERAL COMPRESSION: the radiocapitellar joint is compressed → osteochondral defects, loose bodies, Panner's disease (in adolescents). POSTERIOR IMPINGEMENT: the posteromedial olecranon tip impacts the olecranon fossa in extension → posteromedial osteophyte formation, stress fractures. Treatment: UCL reconstruction ('Tommy John' surgery for UCL tears); olecranon osteophyte excision for posterior impingement; PT: return to throwing program, neuromuscular control, hip-trunk-shoulder kinetic chain conditioning.

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198. **The 'Codman pendulum exercises' for the shoulder work by:**

A. Strengthening the rotator cuff

B. Using GRAVITY and the weight of the arm to provide gentle TRACTION and DISTRACTION of the glenohumeral joint — improving joint mobility, reducing pain, and maintaining ROM during the early healing phase of shoulder injuries

C. Compressing the subacromial space

D. Activating the deltoid

✓ Answer: B

💡 **Rationale & Explanation:**

Codman pendulum exercises: patient leans forward (table support with unaffected arm or just trunk forward flexion). The AFFECTED ARM HANGS FREELY, allowing GRAVITY to provide gentle LONGITUDINAL TRACTION on the glenohumeral joint. The patient sways the TRUNK gently to produce passive circular, forward-backward, and side-to-side movements of the arm — WITHOUT active shoulder muscle contraction. Benefits: joint distraction reduces intra-articular pressure (analgesic); maintains ROM in the rotator cuff repair early phase (when active contraction is prohibited); reduces muscle guarding through gentle movement; promotes synovial fluid circulation. IMPORTANT: the movement comes from TRUNK SWAY, not shoulder muscle activation — otherwise the exercise defeats its purpose. Commonly used in: post-rotator cuff repair, frozen shoulder, acute shoulder injuries, post-fracture rehabilitation.

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199. **The 'center of pressure' (COP) during normal standing balance:**

A. Is fixed at the center of the base of support

B. Is constantly moving — making small corrections to maintain the center of mass over the base of support (the 'quiet standing sway' pattern)

C. Moves only during perturbation

D. Is always posterior to the center of mass

✓ Answer: B

💡 **Rationale & Explanation:**

Center of Pressure (COP) in balance: during QUIET STANDING, the body is never perfectly still — the COP continuously moves within a small elliptical area beneath the feet, making constant micro-corrections. This 'postural sway' is normal and necessary — a completely stationary COP would indicate abnormal rigidity. COP MEASUREMENT (force plate): used to quantify balance — larger sway path, higher sway velocity = worse balance. COP PATH AREA: normal = <1-2 cm^2; increases with: aging, neurological disorders, vestibular disease, peripheral neuropathy. RELATIONSHIP: COP and center of mass (COM) are different: COM = where the body's mass is concentrated; COP = the point of application of the ground reaction force. Normal balance = COP continuously chases the COM to prevent falling.

├— PATHOLOGY

200. The 'straight leg raise' (SLR) test is most sensitive for which clinical condition?

A. Piriformis syndrome

B. LUMBAR DISC HERNIATION with nerve root compression — particularly L4, L5, S1 roots; a positive SLR at <45° with sciatica has ~90% sensitivity for significant disc herniation

C. Lumbar spinal stenosis

D. Sacroiliac joint dysfunction

✓ Answer: B

💡 **Rationale & Explanation:**

SLR sensitivity and clinical use: the SLR (Lasègue's test) has high sensitivity (~75-97%) for LUMBAR DISC HERNIATION causing nerve root compression. It is the BEST SINGLE CLINICAL TEST for this condition. Key features of a true positive SLR: 1) Pain radiates BELOW the knee (dermatomal distribution); 2) Produced at LOW angles (<70°, most

specific at <45°); 3) RELIEVED by ankle plantarflexion (de-tensions the sciatic nerve); 4) EXACERBATED by added neck flexion (re-tensions). Low SPECIFICITY (~26-40%): many conditions can give a false positive (hamstring tightness, hip pathology, piriformis). CROSSED SLR (contralateral SLR reproduces the patient's symptoms): very SPECIFIC for large central disc herniation (~90% specificity). For SPINAL STENOSIS: SLR is usually NEGATIVE — distinguishing feature from disc herniation.

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201. The 'anterior cruciate ligament' tear mechanism in non-contact sports injuries most commonly involves:

A. Direct knee impact from a tackle

B. DECELERATION, pivoting, or landing from a jump with the knee near extension (15-30°) in VALGUS COLLAPSE — the ACL is maximally stressed at near-full extension during sudden deceleration forces

C. Hyperflexion of the knee

D. Running in a straight line

✓ Answer: B

💡 **Rationale & Explanation:**

Non-contact ACL injury mechanism: accounts for ~70% of all ACL tears. Biomechanical pattern: KNEE NEAR EXTENSION (15-30° flexion) when the injury occurs — at this angle the ACL is under maximum tension; combined with VALGUS COLLAPSE (knee falls inward); INTERNAL TIBIAL ROTATION or EXTERNAL FEMORAL ROTATION; often occurs on DECELERATION (landing from a jump, stopping suddenly, pivoting). Risk factors for female athletes: wider pelvis = increased valgus angle; less neuromuscular protection; hormonal effects on ligament laxity. Prevention programs (FIFA 11+, PEP Program): neuromuscular training targeting landing mechanics and gluteus medius strengthening — reduces ACL tear rates by ~50-80% in high-risk populations.

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202. The 'Ottawa foot rules' criteria for ordering foot X-rays after injury include:

A. Any midfoot pain

B. BONE TENDERNESS at the BASE OF THE 5TH METATARSAL or the NAVICULAR, OR inability to weight-bear 4 steps

C. Soft tissue swelling only

D. Pain with resisted plantarflexion

✓ Answer: B

💡 **Rationale & Explanation:**

Ottawa Foot Rules: X-ray is indicated if there is: 1) Bone tenderness at the BASE OF THE 5TH METATARSAL (Jones fracture or 5th MT base avulsion fracture); 2) Bone tenderness at the NAVICULAR bone (navicular stress fracture or acute fracture); 3) Inability to weight-bear (4 steps). Sensitivity: ~99% for clinically significant foot fractures. If all criteria are NEGATIVE: safely rule out fracture, no X-ray needed. This saves unnecessary radiation and costs. Know the difference from the OTTAWA ANKLE RULES (which test the malleoli). Common foot fractures missed without Ottawa Rules application: Jones fracture (proximal diaphysis of 5th MT — treated differently from the more common styloid avulsion), navicular stress fractures (common in athletes, often missed).

ANATOMY

203. The 'superior labrum' of the glenoid extends from the anterior glenoid to the posterior glenoid. The BICEPS LONG HEAD TENDON attaches at:

A. The coracoid process

B. The SUPERIOR GLENOID TUBERCLE and the superior labrum — the biceps anchor is the basis of SLAP lesion pathology (superior labrum anterior to posterior)

C. The lesser tubercle

D. The posterior labrum

✓ Answer: B

💡 **Rationale & Explanation:**

Biceps long head attachment: the long head of the biceps brachii TENDON originates from the SUPERIOR GLENOID TUBERCLE and the superior glenoid labrum. It travels through the glenohumeral joint (intra-articular but extra-synovial), through the bicipital groove of the humerus. SLAP LESION: a tear of the superior labrum at the biceps anchor. The superior labrum provides a significant contribution to glenohumeral stability (especially inferior), and biceps anchor tears can cause instability, pain, and impingement. Positive clinical tests: O'Brien's test (deep shoulder pain with thumb-down position, relieved with supination), Speed's test (pain with resisted shoulder flexion with elbow extended + forearm supinated). SLAP tears are common in overhead athletes and patients with recurrent anterior instability.

PHYSIOLOGY

204. 'Neuromuscular electrical stimulation' (NMES) for a denervated muscle (after complete peripheral nerve injury) has which effect?

A. Restores nerve conduction immediately

B. Can MAINTAIN MUSCLE FIBER SIZE and reduce atrophy while awaiting nerve regeneration — though it cannot reproduce voluntary contraction characteristics, it may slow the denervation atrophy process

C. Has no effect on denervated muscle

D. Causes nerve regeneration directly

✓ Answer: B

💡 **Rationale & Explanation:**

NMES for denervated muscle: after complete peripheral nerve injury, the muscle is denervated — no neural signal from the motor nerve. Without stimulation: denervated muscle undergoes RAPID ATROPHY (fibrotic changes, ACh receptor redistribution, type I → type II fiber ratio changes). With NMES applied directly to the MUSCLE BELLY (not the nerve — the nerve is absent): electrical stimulation can cause direct muscle fiber depolarization and contraction. This may: reduce

the rate of atrophy; maintain muscle fiber architecture; improve capillary density; speed functional recovery when reinnervation occurs. Parameters for denervated muscle require LONGER PULSE WIDTHS (1-300 ms) and DIFFERENT WAVEFORMS than normal NMES (which uses 200-350 µs pulse widths to stimulate the NERVE). This is a specialized application of electrotherapy in peripheral nerve injury rehabilitation.

PATHOLOGY

205. The 'Hoffman reflex' (H-reflex) on nerve conduction study is the electrophysiological equivalent of:

A. The triceps reflex

B. The ACHILLES REFLEX (ankle jerk) — it tests the S1 nerve root reflex arc; absent or delayed H-reflex = S1 nerve root compression or radiculopathy

C. The patellar reflex

D. The Babinski reflex

✓ Answer: B

💡 Rationale & Explanation:

H-reflex: an electrically elicited monosynaptic reflex — stimulating the tibial nerve electrically in the popliteal fossa (low intensity — activates Ia afferents without directly activating motor fibers) → signal travels to S1 anterior horn cell → monosynaptic reflex → motor response in the gastrocnemius-soleus. The H-reflex is the ELECTROPHYSIOLOGICAL EQUIVALENT of the ACHILLES REFLEX. NORMAL: present bilaterally in the calf. ABSENT or DELAYED H-reflex = S1 nerve root dysfunction (disc herniation, radiculopathy). The H-reflex can be recorded from calf; the F-wave (different from H-reflex) tests the ENTIRE motor nerve from distal muscle to spinal cord and back. PT relevance: electrodiagnostic studies help confirm neurological findings and guide rehabilitation planning in radiculopathy patients.

ANATOMY

206. The 'saphenous opening' (fossa ovalis) in the thigh fascia transmits:

A. The femoral nerve

B. The GREAT SAPHENOUS VEIN as it joins the femoral vein — this is also the site through which a FEMORAL HERNIA protrudes inferior and lateral to the pubic tubercle

C. The femoral artery only

D. The obturator nerve

✓ Answer: B

💡 Rationale & Explanation:

Saphenous opening (fossa ovalis): an oval defect in the fascia lata approximately 3-4 cm below the inguinal ligament, just lateral to the pubic tubercle. Through it passes: the GREAT SAPHENOUS VEIN (joining the femoral vein), lymphatics. FEMORAL HERNIA: the femoral canal (medial to the femoral vein) is a potential weak point for herniation — femoral hernias pass through the FEMORAL RING (not the saphenous opening, technically), but appear just below the inguinal ligament medially. Femoral hernias: more common in FEMALES (wider femoral canal due to wider pelvis); higher strangulation risk than inguinal hernias; present as a bulge below and lateral to the pubic tubercle. Compare: INGUINAL hernias are above and medial to the pubic tubercle (more common in males).

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207. The 'tensor fasciae latae' (TFL) muscle performs which actions?

A. Hip extension and external rotation

B. HIP FLEXION + INTERNAL ROTATION + ABDUCTION via the IT band — it also assists in knee extension through the IT band's attachment at Gerdy's tubercle

C. Hip adduction only

D. Knee flexion

✓ **Answer: B**

💡 **Rationale & Explanation:**

TFL function: the TFL originates from the ASIS and iliac crest, inserts into the iliotibial band (ITB). Via the ITB, it acts: HIP ABDUCTION, FLEXION, INTERNAL ROTATION. When the hip is in neutral or extension, the ITB crosses anterior to the knee axis → assists knee EXTENSION. When the knee is >30° flexion, the ITB crosses posterior to the knee axis → assists knee FLEXION. Clinically: TFL tightness contributes to: anterior pelvic tilt, hip flexor pattern dominance, IT band syndrome. The Ober test assesses TFL/ITB tightness. The modified Thomas test knee position differentiates iliopsoas from rectus femoris from TFL: if hip drops to table but knee bends AND hip abducts = TFL tight (abducts as it falls).

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208. The 'dorsal interossei' muscles of the hand perform which primary action?

A. Adduct the fingers (PAD)

B. ABDUCT the fingers away from the middle finger (DAB — Dorsal AbDuct the fingers)

C. Flex the MCP joints only

D. Extend the IP joints only

✓ **Answer: B**

💡 **Rationale & Explanation:**

Hand interossei: DAB and PAD — a critical memory tool. DAB = Dorsal ABduct (dorsal interossei abduct the fingers away from the middle finger axis): 1st dorsal interosseous = index finger ABduction; 2nd = middle finger radial ABduction; 3rd = middle finger ulnar ABduction; 4th = ring finger ABduction (away from middle finger). PAD = Palmar ADduct (palmar interossei adduct the fingers toward the middle finger): 1st = index; 2nd = ring; 3rd = little finger. ALL interossei are innervated by the ULNAR NERVE (deep branch). Also: along with the lumbricals, the interossei FLEX the MCP joints and EXTEND the IP joints (through the extensor expansion). In ulnar nerve palsy: all interossei lost → 'claw hand' (MCP hyperextension + IP flexion of 4th and 5th

fingers) + weakened grip + Froment's sign (APL compensates for lost 1st dorsal interosseous in key pinch).

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209. **The 'plantar plate' at the MTP joint is:**

A. A sesamoid bone

B. A fibrocartilaginous structure on the PLANTAR SURFACE of the MTP joint — provides joint stability, protects against MTP dorsiflexion-induced stress, and anchors the plantar fascia and flexor tendons

C. The intrinsic foot muscle attachment

D. The plantar fascia insertion

✓ Answer: B

💡 **Rationale & Explanation:**

Plantar plate: a dense fibrocartilaginous structure on the PLANTAR ASPECT of the metatarsophalangeal (MTP) joints (2nd-4th most commonly). It: 1) Provides STATIC STABILITY against MTP joint dorsiflexion; 2) Acts as an articular SURFACE for the metatarsal head; 3) Anchors the PLANTAR FASCIA distally; 4) Provides attachment for COLLATERAL LIGAMENTS. PLANTAR PLATE TEAR (plantar plate insufficiency): increasingly recognized cause of forefoot pain — typically at the 2nd MTP joint. Presentation: plantar forefoot pain, swelling at the 2nd MTP joint, 'drawer test' positive (Lachman equivalent for MTP — dorsal displacement of the toe = plantar plate tear). Can progress to hammer toe, crossover toe deformity. Treatment: offloading, MTP buddy taping, orthotics, progressive strengthening, surgery for severe cases.

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210. **The 'subscapularis recess' (subscapularis bursa) communicates with:**

A. The acromial bursa

B. The GLENOHUMERAL JOINT CAPSULE — it is an outpouching of the joint capsule that allows the subscapularis tendon to glide over the coracoid process

C. The bicipital tendon sheath directly

D. The subacromial bursa

✓ Answer: B

💡 **Rationale & Explanation:**

Subscapularis (subcoracoid) recess: an extension of the glenohumeral joint synovium/capsule that protrudes beneath the subscapularis muscle and the coracoid process. It allows: the subscapularis tendon to glide freely over the coracoid process during arm movement. CLINICAL: in glenohumeral joint effusion or arthrography, the subscapularis recess is readily visible — fluid distends it. When injecting the glenohumeral joint, a properly placed injection should distend the subscapularis recess. In FROZEN SHOULDER (adhesive capsulitis): the subscapularis recess is typically OBLITERATED (contracted, fibrosed) along with the rest of the inferior capsule and rotator interval — reducing the total joint volume from normal (20-30 mL) to as little as 5-10 mL. This loss of capsular volume correlates with the loss of range of motion.

├— PHYSIOLOGY

211. The 'oxygen dissociation curve' LEFT SHIFT (increased O2 affinity) is caused by:

A. High altitude training

B. ALKALOSIS (high pH), decreased CO2, decreased temperature, decreased 2,3-DPG — hemoglobin holds O2 more tightly and releases it less readily to tissues

C. Exercise-induced hyperthermia

D. Increased metabolism

✓ **Answer: B**

💡 **Rationale & Explanation:**

O2 dissociation curve LEFT SHIFT factors: BOHR EFFECT REVERSAL: LEFT shift = ALKALOSIS (pH ↑) + DECREASED CO2 + DECREASED TEMPERATURE + DECREASED 2,3-DPG. Hemoglobin holds O2 more tightly → O2 is NOT readily released to tissues. Clinical scenarios causing left shift: 1) FETAL HEMOGLOBIN (HbF) — naturally left-shifted,

allowing it to pick up O2 from maternal HbA; 2) Stored blood (decreases 2,3-DPG); 3) Alkalosis (hyperventilation); 4) Hypothermia (lower body temperature). Clinical implication: a left-shifted curve can cause TISSUE HYPOXIA despite adequate SpO2 — the blood is highly saturated but not releasing O2 to tissues. Important in PT: carbon monoxide poisoning causes a left shift (CO binds hemoglobin, shifting the curve left AND competing with O2) — explains why CO poisoning is doubly dangerous.

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212. The 'Bainbridge reflex' is a cardiovascular reflex that:

A. Reduces heart rate with increased venous return

B. INCREASES HEART RATE in response to INCREASED VENOUS RETURN AND ATRIAL STRETCH — detected by stretch receptors in the atrial walls; complements the Starling mechanism

C. Reduces stroke volume with increased afterload

D. Has no clinical relevance

✓ Answer: B

💡 **Rationale & Explanation:**

Bainbridge reflex: stretch receptors in the ATRIAL WALLS and large veins near the right atrium respond to INCREASED VENOUS RETURN (increased atrial pressure/volume) → signal via vagal afferents to the medulla → INHIBITION of vagal tone + increased sympathetic tone → INCREASED HEART RATE. This reflex helps the heart PUMP MORE when more blood returns (complementing the Starling mechanism which increases STROKE VOLUME, the Bainbridge reflex increases RATE). Clinical: relevant in aquatic therapy (hydrostatic pressure increases venous return → Bainbridge reflex → mild HR increase even at rest in water); post-exercise: when venous return drops suddenly (abrupt cessation of exercise), the Bainbridge reflex reverses → HR drops rapidly → cooling down gradually prevents this abrupt HR drop.

KINESIOLOGY

213. **The 'hip drop' during walking is a normal gait adaptation that occurs:**

A. In all pathological gaits

B. As a SLIGHT (5°) pelvic drop on the swing side during single-limb support — this is NORMAL and reduces energy expenditure by lowering the center of mass; EXCESSIVE hip drop = Trendelenburg pattern from gluteus medius weakness

C. Only in children

D. During the swing phase on the stance side

✓ Answer: B

💡 **Rationale & Explanation:**

Normal pelvic drop (hip drop) in gait: during single-limb support, the NON-STANCE SIDE pelvis drops approximately 5° — this is NORMAL and energy-efficient. It allows the CENTER OF MASS to take a more lateral excursion rather than a large vertical drop — REDUCING ENERGY COSTS of walking (the 6 determinants of gait: pelvic rotation, pelvic list/drop, knee flexion in stance, foot and ankle motion, knee motion, lateral displacement of the trunk). NORMAL 5° drop ≠ Trendelenburg. EXCESSIVE drop (>5°, especially with trunk lean) = Trendelenburg gait from gluteus medius weakness or hip pain. Understanding the NORMAL limits of pelvic motion in gait is essential for distinguishing normal from pathological gait patterns in PT assessment.

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214. **The 'normal cervical lordosis' angle (measured on lateral X-ray) is approximately:**

A. 0° (neutral/straight spine)

B. 30-40° of LORDOSIS (C2-C7 Cobb angle approximately 30-40°) — a moderate forward curve that allows optimal load distribution and neural canal dimensions

C. 60-70° of lordosis

D. 10° of kyphosis

✓ Answer: B

💡 **Rationale & Explanation:**

Normal cervical lordosis: the cervical spine has a NORMAL LORDOTIC CURVE of approximately 30-40° (measured as the Cobb angle from C2 to C7 on a lateral X-ray, or by the Harrison posterior tangent method). This lordosis: 1) Distributes compressive loads across facets AND disc; 2) Maintains the neural canal in optimal dimensions; 3) Positions the head over the center of gravity; 4) Allows maximum flexibility. LOSS OF CERVICAL LORDOSIS (hypolordosis/straightening — 'military neck'): common after whiplash, muscle spasm, or disc disease — often associated with neck pain and restricted motion. EXCESSIVE LORDOSIS (hyperlordosis): less common, may increase facet loading. Cervical alignment is assessed in PT through postural assessment, X-ray interpretation, and clinical examination of range of motion.

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215. The 'hip-knee-ankle (HKA) angle' on a standing AP X-ray defines:

A. The degree of hip anteversion

B. The MECHANICAL AXIS of the lower limb — a line from the center of the femoral head through the center of the knee to the center of the ankle; normal passes through the center of the knee; VALGUS deformity = line passes LATERAL to the knee center; VARUS = MEDIAL

C. Hip joint angles only

D. Foot alignment

✓ Answer: B

💡 **Rationale & Explanation:**

Hip-knee-ankle (HKA) alignment: the MECHANICAL AXIS of the lower extremity (Mikulicz line) runs from the center of the femoral head to the center of the ankle joint. Normal: passes through the center of the knee (within ±0-3 mm). VALGUS (knock-knees): mechanical axis passes lateral to the knee center → lateral compartment overloaded → faster lateral OA. VARUS (bow-legs): axis passes medial to the knee center → medial compartment overloaded → faster medial compartment OA (most common OA pattern). This is measured on FULL-LEG STANDING X-rays and used for: assessing knee OA patterns, planning knee osteotomies (high tibial osteotomy for varus malalignment, distal femoral osteotomy for valgus), and TKA alignment. PT: valgus dynamic

alignment (dynamic knee valgus during movement = different from static HKA alignment) is assessed functionally.

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216. The 'Neutral Spine' concept in rehabilitation means:

A. The spine must always be completely straight

B. The OPTIMAL LOADING POSITION OF THE SPINE — a mid-range lordotic position (NOT maximum extension, NOT full flexion) where compressive forces are balanced and spinal structures are in their most biomechanically efficient alignment

C. Full lumbar flexion

D. Complete absence of movement

✓ Answer: B

💡 **Rationale & Explanation:**

Neutral spine concept: the lumbar spine's NEUTRAL ZONE is the mid-range position between flexion and extension where: disc pressure is minimized; the nucleus pulposus is centrally positioned; facet joint loading is balanced; spinal ligaments and muscles are optimally positioned for load-bearing. 'Neutral spine' does NOT mean zero lordosis — it means the COMFORTABLE NATURAL LORDOSIS. In rehabilitation: maintaining neutral spine during lifting, exercise, and functional activities reduces injury risk. Core stabilization exercises are performed 'in neutral' to train the deep stabilizers (TrA, multifidus) without end-range loading. However: rigid adherence to neutral spine is not always realistic or necessary — the spine MUST flex and extend during daily life. Teach neutral as a preferred loading position, not an absolute rule.

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217. During 'shoulder abduction in the scapular plane' (scaption), the advantages over frontal plane abduction include:

A. Greater subacromial impingement

B. REDUCED SUBACROMIAL IMPINGEMENT (the greater tuberosity clears the acromion more easily), greater muscle activation efficiency, and more physiological glenohumeral mechanics — because the scapular plane is approximately 30-40° anterior to the frontal plane

C. Less rotator cuff activation

D. Greater risk of dislocation

✓ **Answer: B**

💡 **Rationale & Explanation:**

Scapular plane abduction (scaption — the naturally preferred plane): the scapula lies 30-40° anterior to the frontal plane. Abducting in the SCAPULAR PLANE: 1) Aligns the glenohumeral joint more optimally (glenoid and humeral head articular surfaces are co-planar); 2) REDUCES SUBACROMIAL COMPRESSION — the greater tuberosity does not impinge on the acromion as severely as in pure frontal plane abduction; 3) Maximizes rotator cuff muscle length-tension relationship; 4) Reduces capsular tension and pain in impingement patients. Clinical application: when prescribing shoulder exercises for impingement or rotator cuff pathology: use SCAPTION (thumb up, 30-40° anterior) rather than pure frontal plane abduction. The empty can test (Jobe's test) uses this plane — thumb down in scaption maximally stresses the supraspinatus.

PATHOLOGY

218. The DIAGNOSTIC CRITERIA for rheumatoid arthritis (2010 ACR/EULAR criteria) includes a scoring system where a score of ≥6 is required for classification. Which factors are scored?

A. ESR and CRP only

B. JOINT INVOLVEMENT pattern (large joints = 0-2, small joints = 1-5), SEROLOGY (RF/anti-CCP: negative = 0, low positive = 2, high positive = 3), ACUTE PHASE REACTANTS (CRP/ESR: normal = 0, abnormal = 1), and SYMPTOM DURATION (<6 weeks = 0, ≥6 weeks = 1)

C. X-ray findings only

D. Age and sex only

✓ **Answer: B**

💡 **Rationale & Explanation:**

2010 ACR/EULAR RA Classification Criteria (total maximum = 10): JOINT INVOLVEMENT: 1 large joint = 0; 2-10 large joints = 1; 1-3 small joints = 2; 4-10 small joints = 3; >10 joints (at least 1 small) = 5. SEROLOGY: negative RF AND anti-CCP = 0; low positive RF OR anti-CCP = 2; high positive RF OR anti-CCP (>3× ULN) = 3. ACUTE PHASE REACTANTS: normal CRP AND ESR = 0; abnormal CRP OR ESR = 1. DURATION OF SYMPTOMS: <6 weeks = 0; ≥6 weeks = 1. Score ≥6 = definite RA. This framework replaced the older 1987 criteria (which included the 11/18 tender joints and morning stiffness ≥1 hour — still clinically useful but not part of formal classification). PT for RA: individualized exercise program (both aerobic and resistance training shown safe and beneficial during remission), joint protection, and functional rehabilitation.

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219. The 'PRISM model' for chronic pain management integrates:

A. Passive treatment only

B. PHYSICAL, PSYCHOLOGICAL, and SOCIAL domains — recognizing that chronic pain requires a BIOPSYCHOSOCIAL approach that addresses physical impairments, psychological factors (fear, depression, catastrophizing), and social/work factors simultaneously

C. Pharmaceutical management exclusively

D. Surgical intervention only

✓ Answer: B

💡 **Rationale & Explanation:**

PRISM (Psychosocial Risk Identification in Secondary Medicare) or the broader biopsychosocial framework for chronic pain: chronic pain (persisting >3 months) typically involves ALL THREE DOMAINS: PHYSICAL: ongoing nociceptive input (if present), central sensitization, muscle deconditioning, movement restriction; PSYCHOLOGICAL: pain catastrophizing, kinesiophobia, depression, anxiety, maladaptive beliefs ('pain = damage'); SOCIAL: work loss, disability compensation, social isolation, family dynamics reinforcing pain behaviors. Treatment must address all three: PHYSICAL rehabilitation (exercise, manual therapy, pain-free functional movement retraining); PSYCHOLOGICAL

intervention (CBT, acceptance and commitment therapy, graded exposure, pain neuroscience education); SOCIAL REINTEGRATION (vocational rehabilitation, return to work programs, social activity progression). Addressing only the physical domain yields suboptimal outcomes in chronic pain. This is the evidence-based gold standard for chronic musculoskeletal pain management.

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220. The 'KOOS' (Knee injury and Osteoarthritis Outcome Score) is appropriate for:

A. Older patients with hip OA

B. Younger, ACTIVE PATIENTS with knee INJURIES (ACL reconstruction, meniscal repair) or EARLY KNEE OA — it includes sport and recreation subscales that are relevant to this population

C. Back pain patients

D. Shoulder injury outcomes

✓ Answer: B

💡 **Rationale & Explanation:**

KOOS (Knee injury and Osteoarthritis Outcome Score): a patient-reported outcome measure with 5 subscales: Pain, Symptoms (stiffness, swelling), Activities of Daily Living (ADL), Sport and Recreation Function, and Quality of Life. 0-100 (100 = no problems). Designed for: young active patients with knee injuries — it captures sport and recreation function better than WOMAC (which lacks this subscale). Used in: ACL reconstruction outcomes, meniscal repair, anterior knee pain (PFPS), early knee OA in active patients. Compare: WOMAC = better for older knee OA and arthroplasty patients; KOOS = better for younger active patients. KOOS-PS (Physical function Short form) and KOOS-Jr are abbreviated versions. For return-to-sport research: KOOS4 (Pain + Symptoms + ADL + Sport) is widely used.

ANATOMY

221. The 'thoracic outlet' is bounded by the first rib, clavicle, and scalene muscles. Structures passing through it include:

A. Only lymph vessels

B. Subclavian artery, subclavian vein, and brachial plexus — compression of any of these causes thoracic outlet syndrome (TOS)

C. Radial nerve only

D. Carotid artery only

✓ Answer: B

💡 **Rationale & Explanation:**

The thoracic outlet is the space between the first rib, the clavicle, and the scalene muscles. The BRACHIAL PLEXUS (lower trunk C8-T1 most commonly compressed), SUBCLAVIAN ARTERY, and SUBCLAVIAN VEIN all pass through this region. Compression of any of these structures causes the corresponding type of TOS: neurogenic TOS (most common, ~95% — lower trunk compression causing intrinsic hand muscle weakness and ulnar distribution symptoms), arterial TOS (subclavian artery compression causing pallor, claudication), or venous TOS (subclavian vein compression causing upper extremity swelling, 'effort thrombosis'). Causes of compression: cervical rib, tight scalenes, drooping shoulder posture, costoclavicular narrowing, pectoralis minor tightness. PT treatment: scalene and pectoral stretching, thoracic extension mobilization, postural correction, first rib mobilization.

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222. The 'popliteal fossa' is bordered by which muscles?

A. Hamstrings only

B. Semimembranosus and semitendinosus (superomedial), biceps femoris (superolateral), medial and lateral heads of gastrocnemius (inferior)

C. Gastrocnemius only

D. Quadriceps and hamstrings

✓ Answer: B

💡 **Rationale & Explanation:**

Popliteal fossa boundaries: SUPEROMEDIAL: semimembranosus and semitendinosus. SUPEROLATERAL: biceps femoris. INFEROMEDIAL: medial head of gastrocnemius. INFEROLATERAL: lateral head of gastrocnemius (+ plantaris). FLOOR: posterior femoral condyles and popliteal surface; posterior capsule of the knee joint; posterior surface of tibia. ROOF: popliteal fascia + skin. Contents: popliteal artery and vein (deep to the nerve), tibial nerve, common peroneal nerve, small saphenous vein, lymph nodes, fat. Clinical: Baker's cyst arises from the medial floor (semimembranosus bursa). Popliteal aneurysm causes pulsating mass. Deep pressure in the fossa compresses the tibial nerve (motor to posterior leg, plantar foot sensation).

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223. The 'extensor mechanism' of the knee includes which structures?

A. ACL, PCL, MCL

B. Quadriceps muscle, quadriceps tendon, patella, patellar tendon (patellar ligament), and insertion on the tibial tuberosity — all working in series to extend the knee

C. Hamstrings and gastrocnemius

D. IT band only

✓ Answer: B

💡 **Rationale & Explanation:**

Extensor mechanism: the QUADRICEPS (rectus femoris, vastus medialis, intermedius, lateralis) contract and pull through: QUADRICEPS TENDON (attaches to the superior patella) → PATELLA (sesamoid bone that increases the mechanical advantage of the quad) → PATELLAR TENDON/LIGAMENT (attaches patella to tibial tuberosity) → TIBIAL TUBEROSITY (bony attachment). Disruption at any point causes loss of active knee extension: quad muscle tear, quad tendon rupture (above patella), patellar fracture, patellar tendon rupture (below patella), tibial tuberosity avulsion (Osgood-Schlatter in adolescents). Clinical differentiation: palpate the quadriceps tendon vs. patellar tendon for gaps. 'High-riding patella' = patellar tendon rupture. X-ray: patella alta (tendon rupture) vs. patella baja (quad tendon rupture).

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224. **The 'long thoracic nerve' (C5-C6-C7) innervates the serratus anterior. Injury causes:**

A. Deltoid paralysis

B. Winged scapula — the medial border of the scapula protrudes from the chest wall because the serratus anterior can no longer hold it flat against the thorax

C. Wrist drop

D. Elbow flexion weakness

✓ Answer: B

💡 **Rationale & Explanation:**

Long thoracic nerve palsy: the long thoracic nerve (C5-C6-C7) travels along the lateral thorax to innervate the serratus anterior. Vulnerable to injury at: axillary lymph node dissection (mastectomy), shoulder surgery, traction injury (carrying heavy loads, backpacks), compression from prolonged lying on the side. Result: WINGED SCAPULA — loss of serratus anterior function means the scapula is not held flat against the chest wall. On push-up or reaching forward, the medial border and inferior angle of the scapula protrude posteriorly. Functional consequence: impaired shoulder elevation (serratus anterior needed for upward rotation). PT: exercise cannot restore the nerve — serratus strengthening only works if reinnervation occurs. If the nerve is injured (not severed), recovery takes months. Monitor recovery with wall push-up test.

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225. **The 'anterior interosseous nerve' (AIN) is a branch of the median nerve. AIN syndrome presents with:**

A. Carpal tunnel symptoms

B. Inability to flex the distal phalanx of the index finger and thumb (FDP to index + FPL) — the patient cannot make an 'OK' sign — without sensory loss (AIN is purely motor)

C. Wrist drop

D. Ulnar claw

✓ Answer: B

💡 **Rationale & Explanation:**

Anterior interosseous nerve (AIN) syndrome: the AIN is a PURELY MOTOR branch of the median nerve, arising in the proximal forearm and innervating: FDP (to index and middle fingers), FPL (flexor pollicis longus), and pronator quadratus. PRESENTATION: pinch weakness — inability to flex the distal phalanges of the index finger AND thumb simultaneously. Test: 'OK sign' test — patient tries to make an 'O' shape with the tip of the index finger and thumb. In AIN syndrome: the DIP joints remain straight (cannot flex terminally) → the patient makes a PINCH rather than a rounded 'O.' NO SENSORY LOSS (AIN = motor only). Compare: carpal tunnel syndrome (median nerve at wrist) has sensory symptoms. AIN can be compressed in the proximal forearm by the deep head of pronator teres or fibrous bands.

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226. The normal cervical spine has how many vertebrae and how many intervertebral discs?

A. 7 vertebrae, 7 discs

B. 7 vertebrae (C1-C7), 6 intervertebral discs — there is NO disc between C1 (atlas) and C2 (axis), so the cervical spine has one fewer disc than vertebrae

C. 6 vertebrae, 5 discs

D. 8 vertebrae, 8 discs

✓ **Answer: B**

💡 **Rationale & Explanation:**

Cervical vertebrae and discs: 7 cervical vertebrae (C1-C7). INTERVERTEBRAL DISCS: 6 discs — one between each adjacent pair EXCEPT between C1 (atlas) and C2 (axis). The C1-C2 joint is the atlantoaxial joint — it articulates on the dens (odontoid process) of C2 and has NO disc. This is why C1-C2 is unique: rotation is its primary motion (nodding yes occurs at atlanto-occipital joint; rotation for 'no' occurs at C1-C2). Disc herniation: occurs at the disc — therefore C1-C2 disc herniations are impossible. Most common cervical disc herniations: C5-C6 (compresses C6 nerve root) and C6-C7 (compresses

C7 nerve root). Understanding the anatomy explains why specific nerve root levels are affected by specific disc levels.

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227. The 'annular ligament' of the elbow encircles the radial head and attaches to:

A. The ulnar styloid

B. The anterior and posterior margins of the RADIAL NOTCH of the ULNA — this ring-shaped ligament holds the radial head in the radial notch, allowing forearm rotation (pronation/supination)

C. The lateral epicondyle

D. The olecranon

✓ Answer: B

💡 **Rationale & Explanation:**

Annular ligament of the elbow: a ring-shaped ligament encircling the RADIAL HEAD, attaching both ends to the RADIAL NOTCH of the ULNA (anterior and posterior margins). It holds the radial head in the proximal radioulnar joint, allowing the radius to ROTATE (pivot) within the annular ligament during pronation/supination — the radius spins like a wheel within this ring. CLINICAL: NURSEMAID'S ELBOW (radial head subluxation) — in young children (<5 years), a sudden longitudinal traction on a pronated forearm (like pulling a child by the wrist) pulls the radial head out of the loosely attached annular ligament. Child holds the arm limply, refuses to move it. Treatment: SUPINATION while flexing the elbow — the radial head snaps back in. After age 5-6: the annular ligament tightens and nursemaid's elbow becomes rare.

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228. Which of the following is CORRECTLY paired — nerve and its primary motor function?

A. Femoral nerve — hip extension

B. Radial nerve — wrist and finger EXTENSION

C. Median nerve — wrist extension

D. Ulnar nerve — thumb opposition

✓ Answer: B

💡 **Rationale & Explanation:**

Nerve-motor function pairings: RADIAL NERVE (C5-T1, posterior cord) = wrist EXTENSION, finger extension, elbow extension (triceps), supination. MEDIAN NERVE (C6-T1) = wrist FLEXION, finger flexion (FDS, FDP to index/middle), thumb opposition, thenar muscles. ULNAR NERVE (C8-T1) = ring/little finger flexion (FDP), intrinsic hand muscles (interossei, hypothenar, medial two lumbricals), adductor pollicis. FEMORAL NERVE (L2-L4) = knee EXTENSION (quads), hip flexion, thigh sensation. SCIATIC/TIBIAL NERVE = knee flexion (hamstrings), plantar flexion (gastroc-soleus). Radial nerve = extensors; Median nerve = flexors of forearm (radial side) + hand function; Ulnar nerve = intrinsics + ring/little finger. This pairing is a fundamental boards question.

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229. The 'accessory nerve' (CN XI) innervates the:

A. Sternocleidomastoid only

B. Sternocleidomastoid AND upper trapezius — injury causes: inability to shrug the shoulder (upper trapezius), weakness of head rotation (SCM)

C. Brachial plexus

D. Rhomboids

✓ Answer: B

💡 **Rationale & Explanation:**

Accessory nerve (CN XI): the SPINAL ACCESSORY NERVE innervates two muscles: STERNOCLEIDOMASTOID (SCM) — head rotation to the opposite side and ipsilateral lateral flexion; UPPER TRAPEZIUS — shoulder shrug (elevation), head extension, neck lateral flexion ipsilaterally. Injury to CN XI: during posterior triangle of neck surgery (lymph node biopsy, cancer surgery), carotid endarterectomy, or penetrating trauma. Results: TRAPEZIUS PALSY — drooping shoulder, inability to shrug, shoulder pain (from instability), winging of the scapula (lateral, rather than medial winging from long thoracic nerve palsy). Differentiate: long thoracic nerve injury = medial border scapular winging; CN XI injury = lateral scapular winging with shoulder

drop. CN XI injury is a significant cause of shoulder disability after neck surgery.

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230. The 'lumbrical muscles' of the FOOT originate from the flexor digitorum longus tendons and produce:

A. Toe extension at MTP and DIP

B. Flexion of MTP joints and extension of IP joints of toes 2-5 — same action as the hand lumbricals (MCP/MTP flex, IP extend), important for the toe 'push off' mechanism

C. Pure toe flexion

D. Pure toe extension

✓ Answer: B

💡 **Rationale & Explanation:**

Foot lumbricals (4 total): originate from the FDL tendons, insert into the dorsal extensor expansion. Action: FLEX the MTP joints + EXTEND the IP joints — identical mechanical role to the hand lumbricals. In normal gait: the lumbricals stabilize the toes during push-off by preventing the toes from clawing (which would reduce push-off efficiency). In INTRINSIC MINUS FOOT (peripheral neuropathy, nerve injury): lumbricals are weak → toes adopt CLAW TOE deformity (MTP extension + IP flexion) — the extrinsic flexors and extensors act unopposed without intrinsic balance. Diabetic neuropathy commonly causes intrinsic minus foot → clawing → pressure areas under the MTP heads → ulceration. Foot orthoses and appropriate footwear are critical for protection.

PHYSIOLOGY

231. The 'calcium-calmodulin' pathway is important in smooth muscle contraction because:

A. It is the same as cardiac muscle contraction

B. In smooth muscle, Ca2+ binds to CALMODULIN (not troponin), activating myosin light chain kinase (MLCK), which phosphorylates myosin allowing cross-bridge cycling — this differs from skeletal muscle (Ca2+-troponin-tropomyosin mechanism)

C. It controls synaptic transmission

D. It only occurs in cardiac muscle

✓ Answer: B

💡 **Rationale & Explanation:**

Smooth muscle contraction: differs from skeletal/cardiac muscle: In SKELETAL MUSCLE: Ca2+ released from SR → binds TROPONIN C → removes tropomyosin inhibition → actin-myosin cross-bridge cycling. In SMOOTH MUSCLE: Ca2+ enters from extracellular space or SR → binds CALMODULIN (not troponin — smooth muscle has no troponin!) → calmodulin-Ca2+ complex activates MYOSIN LIGHT CHAIN KINASE (MLCK) → phosphorylates myosin light chain → cross-bridge cycling. SMOOTH MUSCLE relaxation: MLCK is inhibited, myosin phosphatase removes the phosphate → relaxation. Clinical relevance: smooth muscle is in blood vessels, airways, GI tract, bladder. Drugs targeting smooth muscle: calcium channel blockers (reduce Ca2+ entry → vasodilation, bronchodilation); beta-2 agonists (activate adenylyl cyclase → cAMP → inhibit MLCK → bronchodilation). Understanding this pathway helps explain why cardiovascular and respiratory drugs work.

---

232. The 'Jendrassik maneuver' enhances deep tendon reflexes by:

A. Applying cold to the limb

B. Having the patient interlock their fingers and PULL OUTWARD just before the tendon tap — this descending facilitation of motor neurons temporarily ENHANCES the reflex arc, making hypoactive reflexes more detectable

C. Direct electrical stimulation

D. Relaxing the muscle completely

✓ Answer: B

💡 **Rationale & Explanation:**

Jendrassik maneuver: a clinical technique to ENHANCE deep tendon reflexes when they appear absent or hypoactive. Method: patient interlocks fingers and PULLS THEIR HANDS APART forcefully while the examiner taps the tendon. For lower extremity reflexes: ask the patient to clasp their hands together and pull. Mechanism: the isometric effort activates the RETICULAR ACTIVATING SYSTEM and increases MOTOR NEURON EXCITABILITY throughout the spinal cord → the reflex arc is amplified → previously undetectable or very weak reflexes can now be elicited. This technique is especially useful for: diagnosing early peripheral neuropathy (where reflexes are diminished but not absent), elderly patients with generally diminished reflexes, and anxious patients whose muscle tension masks the reflex. In clinical examination: always use the Jendrassik maneuver before concluding a reflex is truly absent.

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233. The 'tidal volume' (TV) in a healthy adult at rest is approximately:

A. 50-100 mL

B. 500 mL (0.5 L) — the volume of air inhaled and exhaled with each normal, quiet breath

C. 1500-2000 mL

D. 3500 mL

✓ Answer: B

💡 **Rationale & Explanation:**

Lung volumes — normal adult values: TIDAL VOLUME (TV) = 500 mL (0.5 L) — quiet breathing. INSPIRATORY RESERVE VOLUME (IRV) = 3000 mL — additional volume above TV on forced inspiration. EXPIRATORY RESERVE VOLUME (ERV) = 1200 mL — additional volume below TV on forced expiration. RESIDUAL VOLUME (RV) = 1200 mL — cannot be exhaled. FRC = ERV + RV = 2400 mL. VITAL CAPACITY = IRV + TV + ERV = 4700 mL. TOTAL LUNG CAPACITY = VC + RV = 5900 mL. Clinical: tidal volume decreases with restrictive disease (fibrosis, obesity, pregnancy), increases with exercise (up to 3-4× resting TV during maximal effort). INSPIRATORY CAPACITY (IC) = TV + IRV = the volume

from end-expiration to maximum inspiration — commonly measured in COPD patients (reduced IC from hyperinflation). These lung volumes are the foundation of spirometry interpretation.

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234. The 'Bowman's capsule' and its function in the kidney is relevant to PT because:

A. PTs manage kidney disease directly

B. Some PT patients take diuretics or have renal disease affecting FLUID BALANCE, ELECTROLYTES, and BLOOD PRESSURE — impacting exercise tolerance, edema management, and medication interactions

C. PTs perform kidney dialysis

D. Kidney function is irrelevant to PT

✓ Answer: B

💡 **Rationale & Explanation:**

Kidney function and PT relevance: while PTs don't manage renal disease directly, kidney function significantly impacts PT patients: FLUID BALANCE: renal failure → fluid overload → peripheral edema, pulmonary edema, hypertension. ELECTROLYTES: hyperkalemia (fatal arrhythmias), hyperphosphatemia, hypocalcemia — affect exercise safety. MEDICATIONS: diuretics (increase urine output, affect electrolytes, postural hypotension risk), ACE inhibitors, ARBs. ANEMIA: renal failure → reduced EPO → reduced RBC → reduced exercise capacity. NEUROPATHY: uremic neuropathy causes peripheral sensory-motor deficits similar to diabetic neuropathy. PT PRECAUTIONS: check electrolytes before exercise in dialysis patients; dialysis patients exercise best on non-dialysis days or after dialysis (better volume status); monitor BP closely (dialysis patients often have BP lability); stage exercises carefully for CKD patients based on GFR and comorbidities.

KINESIOLOGY

235. The 'closed pack' position for the ANKLE (talocrural joint) is:

A. Plantarflexion

B. MAXIMUM DORSIFLEXION — in this position the anterior talus (wider part) is fully engaged in the mortise, the ligaments are taut, and the joint is maximally congruent and stable

C. Neutral (0°)

D. Inversion

✓ Answer: B

💡 Rationale & Explanation:

Ankle close-packed position: MAXIMUM DORSIFLEXION. Rationale: the talus is wider anteriorly than posteriorly. In dorsiflexion, the WIDER anterior talus is pressed firmly into the ankle mortise → maximum BONY CONGRUENCE → maximum STABILITY. The collateral ligaments are also most taut in this position. LOOSE-PACKED (resting) position: approximately 10° plantarflexion and slight inversion — ligaments are slack, joint least congruent → used for joint mobilization. Clinical implication: the ankle is most stable in dorsiflexion (weight-bearing on a flat or heels-low surface). The ankle is most vulnerable to ligament injury in PLANTARFLEXION + INVERSION — the narrower posterior talus in the mortise + lax ligaments + inverted position = the classic ankle sprain mechanism.

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236. The 'concave-convex rule' for the SHOULDER: during abduction, the humeral head (convex) moves on the glenoid (concave). The arthrokinematic glide direction is:

A. Same direction as the bone motion (superiorly)

B. OPPOSITE to the bone motion — the humeral head GLIDES INFERIORLY as the bone abducts (moves superiorly). For limited shoulder abduction, apply INFERIOR glide of the humeral head

C. Medially

D. Anteriorly

✓ Answer: B

💡 Rationale & Explanation:

Concave-convex rule at the shoulder: CONVEX SURFACE (humeral head) moving on CONCAVE SURFACE (glenoid) → roll and slide are in OPPOSITE DIRECTIONS. During shoulder ABDUCTION (bone moves upward/superiorly): the humeral head ROLLS superiorly AND GLIDES INFERIORLY simultaneously. If only rolling occurred (no inferior glide), the humeral head would ride off the top of the glenoid. The inferior glide keeps the humeral head centered in the glenoid throughout the arc. Clinical mobilization: for restricted shoulder ABDUCTION → apply INFERIOR glide to the humeral head to restore the missing arthrokinematic component. This is the most commonly tested shoulder mobilization direction on Philippine PT boards.

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237. 'Impaired ankle dorsiflexion' (less than 10° in weight-bearing lunge test) affects gait by causing which COMPENSATORY pattern?

A. Increased ankle dorsiflexion on the other side

B. Early HEEL RISE during stance phase, EXCESSIVE TRUNK LEAN FORWARD, CONTRALATERAL HIP DROP, or SUBTALAR OVERPRONATION — multiple compensatory strategies attempt to allow the tibia to advance over the foot despite the ankle stiffness

C. No gait deviation

D. Increased hip flexion only

✓ Answer: B

💡 **Rationale & Explanation:**

Ankle dorsiflexion restriction and gait compensation: during normal MIDSTANCE to TERMINAL STANCE, the tibia must advance forward over the fixed foot — requiring adequate ankle DORSIFLEXION (approximately 10-15° needed for normal gait). When dorsiflexion is restricted (Achilles tightness, bony impingement, post-fracture, post-cast): COMPENSATORY PATTERNS: 1) EARLY HEEL RISE — the heel lifts early to allow the body to continue advancing, but reduces push-off efficiency; 2) EXCESSIVE FORWARD TRUNK LEAN — the trunk leans forward to advance the COM over the restricted ankle; 3) SUBTALAR OVERPRONATION — the foot overpronates (unlocks the midfoot) to allow apparent forward movement; 4) CONTRALATERAL HIP DROP —

altered pelvic mechanics. All compensatory patterns increase energy cost and stress on adjacent structures. Treatment: gastrocnemius-soleus stretching, talocrural anterior-posterior mobilization, addressing the cause of restriction.

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238. The 'Apley's test' (Apley's grind test) for the meniscus differs from the McMurray by:

A. Both tests are identical

B. Apley's test is performed PRONE with the knee at 90° FLEXION — COMPRESSION + ROTATION (grind test) compresses the meniscus; if this reproduces pain = meniscal pathology; DISTRACTION + ROTATION relieves meniscal pain but reproduces ligament pain — differentiating between meniscal and ligamentous causes

C. Apley's test is done supine

D. Apley's test uses valgus stress

✓ Answer: B

💡 Rationale & Explanation:

Apley's grind test: PRONE position, knee at 90° flexion. COMPRESSION (downward axial force on the tibia) + ROTATION: positive for MENISCAL pathology when compression with rotation produces pain. Mechanism: compression squeezes the meniscus between the tibia and femur → if torn, this impingement hurts. DISTRACTION (pull the tibia upward, unloading the joint) + ROTATION: if DISTRACTION reproduces pain, it suggests LIGAMENTOUS origin (stress on capsular structures). The compression vs. distraction comparison is the unique feature of Apley's test that attempts to differentiate meniscal from ligamentous causes of knee pain. Compare with McMurray (supine, valgus/varus + rotation while extending): same intent but different position and technique. Apley's is less sensitive but provides the distraction differential.

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239. The 'six determinants of gait' (Saunders et al.) describe biomechanical strategies that REDUCE the energy cost of walking. These include:

A. Only step width

B. Pelvic rotation, pelvic tilt (lateral), knee flexion in stance, foot and ankle motion (plantarflexion at heel strike, dorsiflexion in midstance), knee motion, and lateral displacement of the pelvis

C. Only stride length

D. Only arm swing

✓ Answer: B

💡 Rationale & Explanation:

Six determinants of gait (Saunders, 1953): these biomechanical mechanisms minimize the vertical and horizontal displacement of the center of mass, reducing energy expenditure: 1) PELVIC ROTATION (in transverse plane — 4° each side, 8° total) → lengthens the functional leg, reduces dip in COM trajectory; 2) PELVIC TILT/LIST (lateral, 5°) → reduces peak COM elevation; 3) KNEE FLEXION IN STANCE (15-20° at loading response) → attenuates the impact, smooths COM trajectory; 4) FOOT AND ANKLE MOTION → smooth arc of COM movement; 5) KNEE MOTION (combined with ankle); 6) LATERAL DISPLACEMENT (2-3 cm) → enables single limb support. Loss of any determinant (e.g., stiff knee from OA, limited ankle dorsiflexion) increases energy cost. This explains why gait deviations are metabolically expensive and why restoring normal gait mechanics in PT reduces fatigue.

PATHOLOGY

240. 'Spondyloarthropathies' are a group of inflammatory arthritides that share which features?

A. Symmetric joint involvement, RF positive

B. SERONEGATIVE (RF negative), AXIAL SKELETON INVOLVEMENT (sacroiliitis, spondylitis), HLA-B27 association, ENTHESITIS (inflammation at tendon/ligament insertions), and EXTRA-ARTICULAR FEATURES (uveitis, skin lesions)

C. DIP joint predominance, positive anti-CCP

D. Peripheral symmetric polyarthritis only

✓ **Answer: B**

💡 **Rationale & Explanation:**

Spondyloarthropathy (SpA) group: includes: Ankylosing Spondylitis (AS), Psoriatic Arthritis (PsA), Reactive Arthritis (formerly Reiter's), Enteropathic Arthritis (Crohn's, UC), and Undifferentiated SpA. SHARED FEATURES: SERONEGATIVE (negative RF and anti-CCP — unlike RA which is seropositive); HLA-B27 positive (varies by type: AS 90%, reactive arthritis 80%, psoriatic ~50%); SACROILIITIS; ENTHESITIS (Achilles tendon, plantar fascia, patellar tendon insertions painful — distinct from RA); AXIAL INVOLVEMENT (spine, SI joints); OLIGOARTICULAR (affects few, large joints asymmetrically — unlike RA's symmetric small joint polyarthritis); EXTRA-ARTICULAR: anterior uveitis (eye pain, redness), psoriatic skin/nail changes, IBD. PT for SpA: extension exercises (prevent kyphosis in AS), aquatic therapy, posture training, chest expansion exercises, aerobic exercise. Anti-TNF biologics are transformative treatments for active SpA.

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241. The 'FABER' test is POSITIVE for HIP pathology when pain is felt:

A. At the lateral knee

B. IN THE GROIN or anterior hip — indicating intra-articular hip pathology (OA, labral tear, femoral neck stress fracture, psoas impingement)

C. At the lumbar spine only

D. In the calf

✓ **Answer: B**

💡 **Rationale & Explanation:**

FABER test interpretation: the FABER position (hip Flexion, ABduction, External Rotation — 'figure-4' or 'Patrick's position') stresses the hip joint (intra-articular compression) AND the SIJ (posterior hip stress). Pain LOCALIZATION distinguishes the source: ANTERIOR GROIN / INGUINAL PAIN = intra-articular HIP pathology. POSTERIOR SACROILIAC PAIN = SIJ dysfunction. LATERAL THIGH PAIN = IT band or GTPS (greater trochanteric pain syndrome). MEDIAL KNEE PAIN = medial meniscus

referred pain or medial knee ligament. For the HIP pathology interpretation: groin pain during FABER should prompt further hip evaluation (hip X-ray, MRI arthrogram if labral tear suspected). FABER distance test: measure knee-to-table distance, compare bilaterally — asymmetry >4 cm = hip restriction. This simple test has high clinical utility for hip screening.

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242. In lateral ankle sprain management, the 'functional' approach (early protected mobilization) is superior to immobilization because:

A. Sprains heal faster without movement

B. CONTROLLED EARLY MOVEMENT maintains ligament blood flow, promotes collagen fiber alignment, maintains proprioceptive nerve endings, reduces swelling through muscle pump, and produces FASTER return to function without increased re-injury risk compared to immobilization

C. Complete rest is always better

D. Surgery is needed for all grade II sprains

✓ Answer: B

💡 **Rationale & Explanation:**

Functional approach vs. immobilization for lateral ankle sprain: extensive evidence (multiple Cochrane reviews) shows FUNCTIONAL TREATMENT is superior for Grade I-II ankle sprains: 1) FASTER RETURN TO SPORT AND FUNCTION; 2) LESS LONG-TERM PAIN; 3) GREATER PATIENT SATISFACTION; 4) EQUIVALENT OR LOWER RISK OF RE-INJURY. Mechanism of superiority: movement maintains mechanical stimulus for collagen organization; mechanoreceptors in healing ligaments are stimulated → better proprioceptive recovery; muscle pump reduces swelling; early weight-bearing maintains bone loading and cartilage nutrition. FUNCTIONAL TREATMENT: semi-rigid ankle brace (allows plantarflexion/dorsiflexion, controls inversion) + RICE for first 48-72h + early weight-bearing + progressive ROM and strengthening + proprioception retraining. Grade III (complete tear): functional treatment is STILL the first choice for most patients — surgery reserved for recurrent instability after conservative management failure.

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243. The 'McKenzie method' classifies spinal pain into DERANGEMENT, DYSFUNCTION, and POSTURAL syndromes. The MAJORITY of patients with disc herniation fall into which syndrome?

A. Postural syndrome

B. DERANGEMENT syndrome — characterized by movement in one direction centralizing pain (directional preference) and movement in the opposite direction peripheralizing pain; the derangement represents a displacement of disc material that can be reduced with repeated movement

C. Dysfunction syndrome

D. No syndrome — disc herniation is a separate category

✓ Answer: B

💡 **Rationale & Explanation:**

McKenzie derangement syndrome: represents approximately 70-80% of mechanical spinal pain patients, and includes most disc herniation cases. Key features: DIRECTIONAL PREFERENCE — one direction of movement (usually extension for lumbar herniations) CENTRALIZES pain (moves it from leg to spine); opposite direction PERIPHERALIZES pain. RAPID RESPONSE — if the directional preference is correct, patients show improvement even within the first assessment session. The disc material is 'reducible' — it responds to mechanical forces. TREATMENT: prescribe movements in the direction of centralization (usually prone extensions / McKenzie exercises for posterolateral disc herniations). Prognosis: centralization = excellent prognosis, likely avoidance of surgery. Non-centralizers: require further diagnostic workup and may need different approaches or surgical consultation.

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244. Carpal tunnel syndrome (CTS) is more common in which population?

A. Young male athletes

B. WOMEN in their 40s-60s, pregnant women (fluid retention), individuals with diabetes, hypothyroidism, rheumatoid arthritis, repetitive wrist flexion-extension occupations, and obese individuals

C. Adolescents

D. Elite swimmers

✓ **Answer: B**

💡 **Rationale & Explanation:**

CTS risk factors and demographics: CTS is 3× more common in WOMEN than men. Peak incidence: 40-60 years. HIGH-RISK GROUPS: PREGNANCY (fluid retention increases carpal tunnel pressure — symptoms often resolve postpartum); DIABETES (nerve susceptibility + thickened tendons + fluid retention); HYPOTHYROIDISM (myxedematous infiltration of tunnel contents); RHEUMATOID ARTHRITIS (synovial proliferation inside the tunnel); OBESITY (increased fatty infiltration of tunnel); OCCUPATIONAL: repetitive wrist movements, vibrating tools, prolonged wrist flexion-extension; ANATOMICAL: smaller carpal tunnels. Also associated with: menopause, renal failure (dialysis patients), acromegaly, tumors within the tunnel. PT assessment: identify and address modifiable risk factors (workstation ergonomics, wrist positioning, activity modification) alongside CTS-specific interventions (neural mobilization, tendon gliding, splinting, strengthening).

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245. The 'MERIT' or 'MERIT-HF' trial demonstrated that which drug class improves survival in heart failure with reduced ejection fraction (HFrEF)?

A. Calcium channel blockers

B. Beta-blockers (carvedilol, metoprolol, bisoprolol) — previously thought harmful in heart failure, these drugs are now a cornerstone of HFrEF treatment, reducing mortality by ~30-35%

C. Diuretics only

D. Digoxin

✓ **Answer: B**

💡 **Rationale & Explanation:**

Beta-blockers in heart failure: historically, beta-blockers were CONTRAINDICATED in heart failure (feared they would reduce cardiac contractility). Landmark trials (MERIT-HF, CIBIS-II, COPERNICUS) showed that CARVEDILOL, METOPROLOL SUCCINATE, and BISOPROLOL significantly reduce mortality in HFrEF by ~34-35%. Mechanism: NEUROHORMONAL blockade — heart failure activates sympathetic

nervous system chronically → beta-blockers block this harmful chronic activation → reduce adverse cardiac remodeling. PT IMPLICATIONS: patients on beta-blockers have BLUNTED HEART RATE RESPONSE to exercise — their HR may not increase appropriately with exercise. Do NOT use heart rate alone to prescribe exercise intensity for patients on beta-blockers — use RPE (Borg scale) instead. Also: beta-blockers cause exercise fatigue and may limit exercise capacity initially (improves over months of treatment). Know that this class of medication is expected and beneficial — it's not a sign of deterioration.

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246. The 'Waddell signs' in low back pain assessment identify:

A. Serious pathology

B. PSYCHOSOCIAL FACTORS contributing to pain behavior — 5 tests: non-organic tenderness (widespread, superficial), simulation (axial loading or pelvic rotation without actual spine movement causing pain), distraction (positive SLR in supine disappears in sitting), regional disturbances (non-anatomic sensory/motor deficits), and overreaction

C. Malingering definitively

D. Red flag conditions

✓ Answer: B

💡 Rationale & Explanation:

Waddell signs (Gordon Waddell, 1980): five categories of non-organic physical signs in LBP that, when 3 or more are positive, suggest significant PSYCHOSOCIAL (non-organic) contribution to pain. NOT diagnostic of malingering or deception: TENDERNESS: non-anatomic superficial or widespread; SIMULATION: axial loading (pressing down on head causes LBP) or pelvic rotation (hips and shoulders rotated as a block without spine movement causes LBP); DISTRACTION: positive supine SLR that cannot be reproduced in sitting with distraction; REGIONAL: non-dermatomal sensory loss or cogwheel weakness (gives-way weakness); OVERREACTION: disproportionate verbal or motor response to exam. 3+ Waddell signs = yellow flag (psychosocial factors present) → biopsychosocial management approach, pain

neuroscience education, CBT, graded exposure. NOT an excuse to dismiss the patient — these signs indicate the patient needs different management, not that they're faking.

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247. The 'Babinski sign' is elicited by stroking the LATERAL SOLE of the foot from heel to ball. The pathological (positive) response is:

A. Plantar flexion of all toes

B. DORSIFLEXION OF THE GREAT TOE and FANNING (abduction) of the other toes — indicating UPPER MOTOR NEURON LESION (corticospinal tract damage)

C. No response

D. Pain only

✓ Answer: B

💡 **Rationale & Explanation:**

Babinski reflex (plantar reflex): in ADULTS: normal = plantar flexion of the toes (negative Babinski). POSITIVE (abnormal in adults): 1) Great toe dorsiflexes (extends upward); 2) Other toes ABDUCT/FAN outward. This 'extensor plantar response' indicates UMN lesion — stroke, SCI, MS, brain tumor, ALS. Normal in INFANTS under 2 years (immature corticospinal tract). TESTING: use a blunt instrument (key, tongue depressor) along the LATERAL sole from heel to ball, then across the metatarsals. Elicit a slow, sweeping stroke. False positives: ticklish patients who voluntarily withdraw; stroke the same area repeatedly if unclear. Related signs: CHADDOCK'S SIGN (around lateral malleolus), OPPENHEIM'S SIGN (firm pressure along tibia), GORDON'S SIGN (squeezing the calf) — all elicit the same extensor plantar response via different stimulation sites. Any positive = UMN lesion.

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248. The 'active cycle of breathing technique' (ACBT) is MOST indicated for:

A. Strengthening respiratory muscles

B. PATIENTS WITH EXCESSIVE BRONCHIAL SECRETIONS — COPD, cystic fibrosis, bronchiectasis, post-operative patients — to facilitate

secretion mobilization and clearance through breathing control, thoracic expansion, and huffing

C. Pure bronchodilation

D. Reducing breathing rate only

✓ **Answer: B**

💡 **Rationale & Explanation:**

ACBT indications: conditions with excessive secretions that the patient cannot clear effectively on their own. PRIMARY INDICATIONS: CYSTIC FIBROSIS (CF) — the primary secretion clearance technique taught to CF patients for lifelong use; BRONCHIECTASIS; COPD with mucus hypersecretion; POST-OPERATIVE (lung/cardiac surgery); PNEUMONIA; PROLONGED MECHANICAL VENTILATION (adapted technique). ACBT COMPONENTS: 1) BREATHING CONTROL: quiet, relaxed, diaphragmatic breathing — allows rest; 2) THORACIC EXPANSION EXERCISES: 3-5 deep breaths with brief hold — opens collapsed alveoli, drives air behind mucus via collateral ventilation; 3) FORCED EXPIRATION TECHNIQUE (FET/huffing): 1-2 huffs — moves secretions from small to large airways for expectoration. The SELF-MANAGEABLE nature of ACBT makes it ideal for CF patients who must perform airway clearance 2-4 times daily. Compare with chest PT (percussion): requires another person; ACBT is self-administered.

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249. Which of the following is a characteristic X-ray finding in OSTEOARTHRITIS (OA) of the knee?

A. Osteoporosis and subchondral bone loss

B. JOINT SPACE NARROWING (cartilage loss), OSTEOPHYTES (bone spurs at joint margins), SUBCHONDRAL SCLEROSIS (increased bone density under cartilage), and SUBCHONDRAL CYSTS

C. Periarticular osteoporosis and erosions

D. Calcification of ligaments

✓ **Answer: B**

💡 **Rationale & Explanation:**

OA knee X-ray findings: JOINT SPACE NARROWING: the most sensitive early sign — as cartilage erodes, the gap between femur and tibia decreases (medial compartment most often affected in varus-aligned knees). OSTEOPHYTES (bone spurs): reactive bone formation at joint margins — the body's attempt to stabilize the joint; seen at the femoral and tibial condyle edges, and posterior to the PCL attachment. SUBCHONDRAL SCLEROSIS: increased bone density (whiteness) directly under the denuded cartilage — the bone responds to increased direct loading. SUBCHONDRAL CYSTS: fluid-filled cavities in the bone beneath the cartilage — thought to form from synovial fluid driven into the bone under pressure. Comparison with RA X-rays: RA = periarticular OSTEOPOROSIS + EROSIONS (bone eaten away) + soft tissue swelling; OA = bone FORMATION (osteophytes, sclerosis) + bone destruction. OA = ADDITIVE bone changes; RA = DESTRUCTIVE bone changes.

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250. 'Sudeck's atrophy' is another name for:

A. Peripheral neuropathy

B. COMPLEX REGIONAL PAIN SYNDROME Type 1 (CRPS-1) — characterized by severe osteoporosis of the affected limb visible on X-ray (the 'Sudeck's atrophy' pattern), alongside the clinical features of CRPS: burning pain, allodynia, vasomotor and sudomotor changes, trophic changes

C. Osteoporosis of aging

D. Avascular necrosis

✓ Answer: B

💡 **Rationale & Explanation:**

Sudeck's atrophy (Paul Sudeck, 1900): the historical term for CRPS-1, specifically referring to the patchy OSTEOPOROSIS visible on X-ray. The rapid, severe osteoporosis of CRPS occurs because: sympathetic nervous system dysregulation → altered blood flow to bone → osteoclast overactivation → bone resorption exceeds bone formation. X-ray: 'spotty' or 'patchy' demineralization of the affected limb (hand, wrist, or foot — wherever CRPS occurred). The name 'Sudeck's

atrophy' is now replaced by 'CRPS Type 1' in modern terminology, but the historical term still appears in boards and clinical literature. CRPS-1: no identifiable nerve injury (unlike CRPS-2 which follows a defined nerve injury). Budapest criteria (sensory, vasomotor, sudomotor, motor/trophic signs) must be met for diagnosis. PT: graded motor imagery, desensitization, gentle progressive loading, mirror therapy.

├─ PHYSIOLOGY

251. The 'Fick's first law of diffusion' applies to gas exchange in the lungs. The rate of diffusion is increased by:

A. Smaller surface area and thicker membrane

B. LARGER SURFACE AREA (alveolar-capillary membrane), THINNER MEMBRANE, GREATER CONCENTRATION GRADIENT, and SMALLER MOLECULAR WEIGHT — in clinical disease, loss of alveolar surface area (emphysema) and thickened membrane (fibrosis) impair gas exchange

C. Higher pressure on expiration only

D. Lower FiO2

✓ Answer: B

💡 Rationale & Explanation:

Fick's first law of diffusion: Rate of Diffusion (Q) ∝ (Surface Area × Concentration Gradient × Solubility) / (Thickness × √Molecular Weight). Factors that INCREASE diffusion: SURFACE AREA ↑ (normal lung has ~70m² of alveolar surface); CONCENTRATION GRADIENT ↑ (supplemental O2 increases FiO2 → increases alveolar pO2 → increases gradient from alveolus to blood); MEMBRANE THICKNESS ↓ (thinner = faster diffusion); HIGHER SOLUBILITY (CO2 is 20× more soluble than O2 — diffuses much faster despite lower gradient). CLINICAL IMPAIRMENTS: EMPHYSEMA: destroys alveolar walls → reduced surface area → impaired O2 diffusion (DLCO reduced). PULMONARY FIBROSIS: thickened alveolar-capillary membrane →

impaired diffusion (DLCO reduced, restrictive pattern). O2 therapy increases concentration gradient → improves diffusion-limited hypoxemia.

├─ KINESIOLOGY

252. The 'metatarsalgia' (pain under the metatarsal heads) biomechanical cause is:

A. Weak ankle muscles

B. EXCESSIVE FOREFOOT LOADING — the metatarsal heads bear weight during late stance and push-off; normally the fat pad under each MT head distributes this load; with HIGH ARCHES (pes cavus), fat pad atrophy, or ill-fitting footwear, load concentrates under specific MT heads causing pain

C. Hip weakness

D. Ankle dorsiflexion excess

✓ Answer: B

💡 **Rationale & Explanation:**

Metatarsalgia biomechanics: the metatarsal heads bear the body's full weight during TERMINAL STANCE and TOE-OFF (the final phase of push-off). Normally: the fat pad under each MT head cushions and distributes this pressure; the intrinsic muscles (lumbricals, interossei) maintain toe position. PREDISPOSING FACTORS: HIGH-HEELED SHOES (transfers weight forward to MT heads); PES CAVUS (high arch concentrates pressure under 1st and 5th MT heads + reduces shock absorption); FAT PAD ATROPHY (elderly, steroid injections, RA — the natural cushion thins); PROMINENT MT HEADS (2nd or 3rd MT head drops, becomes plantarflexed); HALLUX VALGUS/BUNION (first ray insufficiency transfers load to 2nd MT head); MORTON'S NEUROMA (not truly metatarsalgia but overlaps). PT: metatarsal pads (offload the affected MT head), custom orthotics, intrinsic foot strengthening, footwear advice, calf stretching.

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253. **In shoulder rehabilitation, the 'scapular plane' is important for exercise prescription because:**

A. Exercises in this plane are always easier

B. The scapular plane (30-40° anterior to the frontal plane) OPTIMIZES ROTATOR CUFF MUSCLE ACTIVATION, REDUCES SUBACROMIAL IMPINGEMENT, AND MAXIMIZES GLENOHUMERAL JOINT CONGRUENCE compared to pure frontal plane exercises

C. Exercises in this plane always cause impingement

D. The scapular plane is only for swimming

✓ Answer: B

💡 **Rationale & Explanation:**

Why train in the scapular plane: The SCAPULAR PLANE (called 'scaption') is 30-40° forward of the frontal plane — this is where the scapula actually lies on the thorax. Benefits of exercising in the scapular plane: 1) ROTATOR CUFF OPTIMIZATION: supraspinatus, infraspinatus, and subscapularis are more co-activated and at better length-tension in the scapular plane; 2) REDUCED IMPINGEMENT: the greater tuberosity does not impinge on the acromion in the scapular plane as severely as in pure frontal plane abduction (because the joint is more anatomically aligned); 3) GLENOHUMERAL CONGRUENCE: articular surfaces are more co-planar → less capsular strain; 4) MORE FUNCTIONAL: most overhead activities occur anterior to the frontal plane. For impingement patients: prescribe all shoulder strengthening exercises in the scapular plane (30-40° forward of frontal) rather than the frontal plane to reduce symptom provocation.

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254. **The term 'kinetic chain' in PT and sports science means:**

A. A mechanical chain for lifting

B. The series of joint and muscle segments that WORK TOGETHER during a movement — 'open kinetic chain' (OKC) when the distal segment is free; 'closed kinetic chain' (CKC) when the distal segment is fixed — forces and motions at one segment affect all others in the chain

C. The neural circuit for reflex

D. The tendon-to-tendon connection

✓ Answer: B

💡 Rationale & Explanation:

Kinetic chain concept: a fundamental framework in PT and sports biomechanics. OKC: the distal segment is FREE to move — e.g., seated knee extension (foot free), biceps curl (hand free). FORCES: isolated to the moving segment; less joint compression from muscle co-contraction. CKC: the distal segment is FIXED — e.g., squat (feet fixed to the ground), push-up (hands fixed). FORCES: distributed across multiple joints simultaneously; more co-contraction; more similar to real-world activities. 'KINETIC CHAIN' in sport: throwing a ball uses the ENTIRE kinetic chain — ground contact → ankle → knee → hip → trunk → shoulder → elbow → wrist → ball. Power is generated from the ground up. KINETIC CHAIN DISRUPTION: if a link in the chain is weak (hip abductor weakness → dynamic valgus → knee stress → ACL injury risk), the whole chain is affected. This explains why treating the hip helps the knee (and why lumbar dysfunction affects shoulder mechanics).

├— PATHOLOGY

255. The 'myofascial trigger point' (TrP) model proposed by Simons and Travell: the electrophysiological basis involves:

A. Demyelination of motor nerves

B. EXCESSIVE ACETYLCHOLINE RELEASE at a dysfunctional motor end plate — creates a 'ENERGY CRISIS' in the affected muscle fibers (excessive Ca2+ release → sustained local contraction → ischemia → metabolite accumulation → sensitization of local nociceptors → the palpable taut band and tender point)

C. Inflammatory arthritis of the fascia

D. Bone spur formation

✓ Answer: B

💡 **Rationale & Explanation:**

Simons and Travell trigger point mechanism (integrated hypothesis): 1) A DYSFUNCTIONAL MOTOR END PLATE releases excess ACh (from trauma, overuse, psychological stress) → 2) SUSTAINED SARCOMERE CONTRACTION in the affected motor end plate region (not a whole muscle contraction, just a localized area) → 3) LOCAL ISCHEMIA (contracted sarcomeres compress local capillaries) → 4) ENERGY CRISIS: ATP depletion → Ca2+ cannot be pumped back into the SR → sustained contraction → 5) Metabolite accumulation (bradykinin, substance P, serotonin, etc.) → 6) SENSITIZATION of nociceptors → LOCAL TENDERNESS + REFERRED PAIN PATTERN. The palpable TAUT BAND = the group of dysfunctional sarcomeres (palpable as a taut rope-like band). EMG evidence: spontaneous electrical activity (SEA) at the TrP site — dysfunctional end plate noise. Dry needling disrupts this cycle by mechanically disrupting the end plate and stimulating the local twitch response.

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256. The 'shoulder impingement' classification by Bigliani: a TYPE III (hooked) acromion is most associated with:

A. Least impingement risk

B. HIGHEST RISK of rotator cuff impingement and tears — the anterior hook of the Type III acromion mechanically compresses the supraspinatus tendon with overhead arm elevation

C. Normal anatomy

D. Posterior impingement only

✓ **Answer: B**

💡 **Rationale & Explanation:**

Bigliani acromion classification (on outlet view X-ray): TYPE I (flat/curved, convex inferior surface) = LOWEST impingement risk; TYPE II (curved, concave inferior surface) = MODERATE risk; TYPE III (hooked, anterior hook that projects inferiorly) = HIGHEST impingement risk. Type III acromion: the inferior hook narrows the subacromial space anteriorly → the supraspinatus tendon is repeatedly compressed under this hook with every overhead arm

movement → progressive tendinopathy → partial and full thickness tears. Prevalence: ~3-5% of the general population have Type III acromia; they are disproportionately represented in rotator cuff tear patients. Clinical: Type III is often found incidentally on X-ray in patients with chronic shoulder pain and rotator cuff tears. Surgical option: subacromial decompression (acromioplasty) reshapes or removes the hook, decompressing the supraspinatus. PT: conservative management first — modify activities, strengthen rotator cuff and scapular muscles, posture correction.

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257. 'Repetitive strain injury' (RSI) — now more commonly called 'work-related upper extremity musculoskeletal disorder' (WR-UEMD) — is best prevented by:

A. Complete rest from work

B. ERGONOMIC WORKPLACE DESIGN, regular break schedules, exercise programs, early reporting and treatment of symptoms, and workstation modifications — targeting the cycle of excessive load, insufficient recovery, and gradual tissue damage

C. Only medication

D. Only surgery

✓ Answer: B

💡 **Rationale & Explanation:**

RSI/WR-UEMD prevention: the biomechanical model: EXCESSIVE REPETITION + AWKWARD POSTURE + INSUFFICIENT RECOVERY TIME → cumulative tissue micro-damage → tendinopathy, nerve compression, muscle fatigue → pain → disability. PREVENTION STRATEGIES: ERGONOMICS: workstation designed to keep joints in neutral (neutral wrist, 90° elbow, shoulder relaxed, screen at eye level); BREAKS: micro-breaks every 20-30 minutes (even 30 seconds of stretching reduces cumulative strain); EXERCISE: strengthening the involved muscles reduces fatigue-related strain; EARLY REPORTING: addressing early symptoms before they become chronic; TASK ROTATION: varying tasks uses different muscle groups, reducing cumulative load on any one area. PT ROLE: workplace ergonomic assessment, exercise

prescription, return-to-work graded programs, education. Industries with high RSI risk: meatpacking, computer work, assembly lines, hairdressing, dental work, musical instrument playing.

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258. Post-mastectomy lymphedema: risk factors for developing this condition include:

A. Sentinel node biopsy only, no other factors

B. AXILLARY LYMPH NODE DISSECTION (more nodes removed = higher risk), POST-OPERATIVE RADIATION THERAPY, OBESITY (BMI >30), INFECTION in the affected limb, and INJURY to the affected arm — cumulative risk with multiple factors

C. Complete mastectomy type alone

D. Anti-cancer chemotherapy only

✓ Answer: B

💡 **Rationale & Explanation:**

Post-mastectomy lymphedema risk factors: occurs in 20-50% of women after axillary surgery. PRIMARY FACTORS: 1) AXILLARY LYMPH NODE DISSECTION (ALND): removing many nodes significantly reduces lymphatic drainage capacity; sentinel lymph node biopsy (SLNB) alone has much lower risk (~7% vs. 20-40% for ALND); 2) RADIATION THERAPY: radiation fibroses lymphatic vessels and nodes → further compromises drainage; 3) OBESITY: increased limb adipose tissue = increased lymphatic load; 4) POST-OPERATIVE INFECTION: cellulitis damages remaining lymphatics — each episode worsens lymphedema; 5) INJURY/BURNS to the arm: any additional lymphatic disruption. PREVENTION: patient education (avoid injury, blood pressure cuffs, venipuncture in affected arm; prompt treatment of skin breaks to prevent infection; exercise; compression garment during air travel). PT TREATMENT: Complete Decongestive Therapy (CDT) — manual lymphatic drainage (MLD) + multi-layer compression bandaging + therapeutic exercise + skin care.

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259. The 'ASIA Classification' was first published by the American Spinal Injury Association in:

A. 1956

B. 1984 — and has been revised multiple times (most recently 2019), with the ISNCSCI examination becoming the global standard for SCI neurological classification

C. 2020

D. 1945

✓ Answer: B

💡 Rationale & Explanation:

ASIA history and updates: The AMERICAN SPINAL INJURY ASSOCIATION (ASIA) published its first SCI classification standards in 1984. Major revisions: 1992 (ASIA Impairment Scale introduced), 1996, 2000, 2006, 2011, 2019 (most recent). Current standard: ISNCSCI (International Standards for Neurological Classification of SCI) — administered by ASIA and ISCoS (International Spinal Cord Society). The ISNCSCI 2019 version includes clarifications on assessment procedures and definitions of sensory and motor levels. Why it matters: standardized classification enables: consistent communication among clinicians worldwide; comparison of research results across studies; outcome tracking in clinical trials; rehabilitation goal setting. In the Philippines: ASIA/ISNCSCI is the standard classification used in all rehabilitation hospitals for SCI. Filipino PTs working with SCI must be proficient in performing the ISNCSCI examination.

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260. The 'yellow flags' in back pain (psychosocial risk factors) associated with POOREST prognosis include all of the following EXCEPT:

A. Catastrophizing thoughts ('this pain means damage')

B. Pain during activity

C. Previous back pain with poor recovery

D. Being on sick leave for more than 4 weeks

✓ Answer: B

💡 Rationale & Explanation:

Yellow flags — poorest prognosis factors: HIGHEST RISK YELLOW FLAGS: Catastrophizing ('I will never get better,' 'this pain means

serious damage'); Prior poor recovery history; SICK LEAVE >4 weeks (strongest predictor of long-term disability); Low self-efficacy; Depression and anxiety; Fear of re-injury (kinesiophobia); Low job satisfaction or physical work demands; Compensation/litigation involvement; Belief that passive treatments (injections, rest) will fix the problem; Family reinforcing disability behavior. PAIN DURING ACTIVITY: this is expected in early LBP — nearly ALL LBP patients have pain with activity. It is NOT a significant yellow flag alone. The distinction: pain with activity that is DISPROPORTIONATE and leads to complete avoidance (fear-avoidance) = yellow flag. Ordinary pain with movement that the patient manages while remaining active = NOT a significant yellow flag. The STarT Back Tool (SBT) is validated for yellow flag screening in primary care LBP.

ANATOMY

261. The 'thoracic outlet' contains which structures that can be compressed in thoracic outlet syndrome?

A. Radial nerve only

B. Subclavian artery, subclavian vein, and brachial plexus (lower trunk C8-T1 most vulnerable)

C. Axillary nerve and circumflex artery

D. Carotid artery and vagus nerve

✓ Answer: B

💡 Rationale & Explanation:

The thoracic outlet is bounded by the first rib, clavicle, and scalene muscles. The BRACHIAL PLEXUS lower trunk (C8-T1), SUBCLAVIAN ARTERY, and SUBCLAVIAN VEIN all pass through this region. Neurogenic TOS (95% of cases) compresses the lower trunk → hand intrinsic weakness, ulnar forearm/hand numbness. Arterial TOS → pallor, claudication. Venous TOS → arm swelling, effort thrombosis. PT treatment: scalene and pectoral stretching, thoracic extension mobilization, postural correction, first rib mobilization.

262. **The 'popliteal fossa' boundaries include which muscles superolaterally?**

A. Semimembranosus

B. Biceps femoris

C. Medial gastrocnemius

D. Gracilis

✓ Answer: B

💡 **Rationale & Explanation:**

The popliteal fossa: SUPEROMEDIAL borders = semimembranosus and semitendinosus. SUPEROLATERAL = BICEPS FEMORIS. INFEROMEDIAL = medial gastrocnemius. INFEROLATERAL = lateral gastrocnemius + plantaris. Contents: popliteal artery and vein (deep), tibial nerve, common peroneal nerve, small saphenous vein, lymph nodes. Baker's cyst arises from the medial floor. Common peroneal nerve wraps around the fibular head — vulnerable to injury at this site.

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263. **The SITS mnemonic for rotator cuff stands for:**

A. Subscapularis, Iliopsoas, Teres major, Supraspinatus

B. Supraspinatus, Infraspinatus, Teres minor, Subscapularis

C. Serratus, Infraspinatus, Trapezius, Subscapularis

D. Supraspinatus, Iliopsoas, Trapezius, Subscapularis

✓ Answer: B

💡 **Rationale & Explanation:**

SITS = Supraspinatus (abduction), Infraspinatus (ER), Teres minor (ER), Subscapularis (IR). Together they compress the humeral head into the glenoid, maintaining stability while larger muscles generate motion. Innervation: supraspinatus + infraspinatus = suprascapular nerve (C5-C6); teres minor = axillary nerve; subscapularis = upper and lower subscapular nerves (C5-C6). The most commonly torn is the supraspinatus (impingement zone under the acromion).

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264. **The posterior tibial artery passes through which structure to supply the plantar foot?**

A. Sinus tarsi

B. Tarsal tunnel (beneath flexor retinaculum at the medial ankle)

C. Lateral compartment

D. Anterior tibial compartment

✓ Answer: B

💡 Rationale & Explanation:

The posterior tibial artery travels in the deep posterior compartment of the leg and passes through the TARSAL TUNNEL beneath the flexor retinaculum at the medial ankle, along with the tibial nerve and flexor tendons (Tom, Dick, And Very Nervous Harry). After exiting, it divides into medial and lateral plantar arteries. The posterior tibial pulse is palpated posterior to the medial malleolus — important for peripheral vascular assessment. Absent pulse suggests peripheral arterial disease.

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265. A 'pivot joint' allows which type of motion?

A. Flexion and extension

B. Rotation only

C. Abduction and adduction

D. All three planes

✓ Answer: B

💡 Rationale & Explanation:

Pivot (trochoid) joints allow ROTATION only. Examples: proximal radioulnar joint (radial head rotates within annular ligament — pronation/supination), distal radioulnar joint, atlantoaxial (C1-C2 — cervical rotation). Compare: hinge joints (elbow, IP joints) = uniaxial flex/extend; condyloid (wrist, MCP) = biaxial; saddle (1st CMC) = biaxial; ball-and-socket (hip, GHJ) = triaxial.

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266. The 'spheno-occipital synchondrosis' fuses at approximately what age?

A. Birth

B. Age 18-25

C. Age 5

D. Age 50

✓ **Answer: B**

💡 **Rationale & Explanation:**

The spheno-occipital synchondrosis (SOS) is a cartilaginous growth junction between the sphenoid and occipital bones at the skull base. It is the LAST major cranial synchondrosis to fuse, typically at age 18-25. Before fusion it is a growth plate influencing craniofacial development. It is referenced in craniosacral therapy models as transmitting the 'craniosacral rhythm' — though this concept is not well-supported scientifically. Premature fusion causes craniosynostosis affecting facial and cranial growth.

├— PHYSIOLOGY

267. The coronary arteries fill primarily during which phase of the cardiac cycle?

A. Systole

B. Diastole — when the ventricles relax and myocardial compression of intramural vessels is absent

C. Both equally

D. Neither phase

✓ **Answer: B**

💡 **Rationale & Explanation:**

During SYSTOLE, myocardial contraction compresses intramural coronary vessels, impeding flow. During DIASTOLE, the myocardium relaxes, the aortic valve closes, and blood flows into the coronary ostia. High heart rates shorten diastole more than systole → reduced coronary filling time → angina risk in coronary artery disease. This explains why tachycardia is poorly tolerated in patients with CAD.

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268. The 'diving reflex' produces which cardiovascular response?

A. Tachycardia and vasodilation

B. Bradycardia and peripheral vasoconstriction — conserving oxygen for vital organs during submersion

C. Only apnea

D. Only hypertension

✓ Answer: B

💡 **Rationale & Explanation:**

The diving reflex is triggered by COLD WATER on the face (trigeminal nerve) → vagal bradycardia + sympathetic peripheral vasoconstriction, sparing cardiac and cerebral blood flow. In aquatic therapy with cold water, this reflex may slow HR — important when prescribing exercise intensity by HR targets in cold water immersion. Clinically, cold water facial immersion can terminate certain supraventricular tachycardias as a vagal maneuver.

KINESIOLOGY

269. The hip abductor force required during single-leg stance is approximately how many times body weight?

A. 0.5×

B. 2-3× body weight — because the muscle moment arm is much shorter than the moment arm of body weight through the center of mass

C. Equal to body weight

D. 4-5× body weight

✓ Answer: B

💡 **Rationale & Explanation:**

Free body diagram of single-leg stance: the COM is medial to the femoral head by ~5 cm; the hip abductor moment arm is ~5-7 cm. For equilibrium: abductor force × short arm = body weight × longer arm → abductor must generate 2-3× body weight force. For a 70 kg person: hip abductor force = ~1400-2100 N. This explains why hip abductor

weakness → Trendelenburg gait, and why functional hip loading demands far exceed sidelying abduction exercise forces.

PATHOLOGY

270. 'Sever's disease' (calcaneal apophysitis) affects primarily:

A. Adults over 50

B. Children and adolescents aged 8-14 who are physically active — the unfused calcaneal apophysis is stressed by Achilles traction during running and jumping

C. Sedentary elderly patients

D. Elite marathon runners

✓ Answer: B

💡 **Rationale & Explanation:**

Sever's disease: the calcaneal apophysis (secondary ossification center at the posterior calcaneus, Achilles attachment site) has not yet fused in growing children. Repetitive traction during rapid growth periods → apophysitis. Presents as heel pain in active children, worse with activity, tender at the posterior calcaneus (positive squeeze test), often bilateral. X-ray: fragmented apophysis (often normal variant — correlate with symptoms). Treatment: heel cups, calf stretching, activity modification. Resolves with apophyseal fusion (~age 14-15).

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271. The Schatzker classification applies to which fractures?

A. Femoral neck

B. Tibial plateau — Types I-VI based on condyle involvement, depression, and energy

C. Distal radius

D. Ankle

✓ Answer: B

💡 **Rationale & Explanation:**

Schatzker tibial plateau: Type I = lateral split (young, no depression); Type II = lateral split + depression (commonest); Type III = lateral pure depression; Type IV = medial plateau (high energy, poor prognosis); Type V = bicondylar (both condyles); Type VI = bicondylar with metaphyseal-diaphyseal separation (highest energy). PT: CPM post-operatively, protected weight-bearing, progressive ROM and strengthening based on fracture stability.

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272. **Stage II PTTD (posterior tibial tendon dysfunction) is characterized by:**

A. Normal arch

B. Flexible flatfoot — the foot is flatfoot in standing but can be passively corrected; single-heel rise impossible; too-many-toes sign positive

C. Rigid fixed flatfoot

D. Ankle valgus involvement

✓ Answer: B

💡 **Rationale & Explanation:**

Johnson and Strom PTTD staging: Stage I = tendinitis, normal alignment. Stage II = FLEXIBLE FLATFOOT — partial tendon tear, progressive flatfoot (hindfoot valgus, forefoot abduction), single-heel rise impossible, too-many-toes sign positive, arch correctable passively. Stage III = rigid flatfoot (fixed contracture). Stage IV = rigid flatfoot + ankle deltoid stretching. PT: Stage I-II = conservative (orthotics, strengthening, activity modification); Stages III-IV often surgical.

ANATOMY

273. **Chopart's joint is:**

A. The ankle joint

B. The transverse tarsal joint — comprising the talonavicular joint (medially) and calcaneocuboid joint (laterally)

C. The subtalar joint

D. The metatarsophalangeal joint

✓ **Answer: B**

💡 **Rationale & Explanation:**

Chopart's joint (transverse tarsal/midtarsal joint): TALONAVICULAR (medially) + CALCANEOCUBOID (laterally). When the subtalar joint is pronated, the Chopart joint axes become parallel → foot unlocked and flexible (shock absorption). When the subtalar joint is supinated, axes become perpendicular → midtarsal joint locked → rigid lever for push-off. Chopart's amputation removes the forefoot at this level, creating significant balance and prosthetic challenges.

├— PATHOLOGY

274. Lisfranc joint injury is commonly missed because:

A. It is very rare

B. Subtle injuries may appear normal on non-weight-bearing X-rays; diastasis between the 1st and 2nd metatarsal bases is only visible on weight-bearing X-rays (>2mm gap = positive)

C. It always causes severe deformity

D. Standard X-ray always shows it

✓ **Answer: B**

💡 **Rationale & Explanation:**

Lisfranc injury: the TMT joint complex, especially the medial cuneiform-2nd MT articulation and Lisfranc ligament. CLINICAL RED FLAGS: midfoot pain, swelling, plantar ecchymosis (very specific for Lisfranc), inability to bear weight. IMAGING: non-weight-bearing X-ray may be normal; WEIGHT-BEARING X-RAY reveals diastasis if >2mm between 1st and 2nd MT bases. MRI for ligamentous injury without

diastasis. Plantar ecchymosis + midfoot pain = suspect Lisfranc until proven otherwise → weight-bearing imaging required.

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275. A 'bipartite patella' is:

A. A fractured patella

B. A normal developmental variant where a secondary ossification center (usually superolateral) fails to fuse — typically incidental; can become symptomatic with trauma

C. A disease causing chronic knee pain

D. A sign of patellar instability

✓ Answer: B

💡 **Rationale & Explanation:**

Bipartite patella: present in 2-3% of the population. Most common location: superolateral pole (Type III, 75%). Usually BILATERAL — helps distinguish from acute fracture (which has sharp, irregular edges vs. rounded, smooth borders of bipartite). Usually ASYMPTOMATIC — found incidentally. Can become SYMPTOMATIC after trauma or overuse — disruption of the fibrocartilaginous junction causes local pain and tenderness. Treatment when symptomatic: activity modification, ice, NSAIDs, quadriceps strengthening, activity modification.

├— KINESIOLOGY

276. The 'transversus abdominis' (TrA) muscle fibers run in what direction?

A. Vertically

B. Horizontally — like a corset wrapping around the trunk, creating tension in the thoracolumbar fascia and raising intra-abdominal pressure for segmental spinal stabilization

C. Obliquely (same as external oblique)

D. Longitudinally (same as rectus abdominis)

✓ **Answer: B**

💡 **Rationale & Explanation:**

TrA fibers are HORIZONTAL — running perpendicular to the trunk axis. FUNCTIONS: 1) Increases intra-abdominal pressure (hydraulic spinal support); 2) Creates tension in the thoracolumbar fascia (force closure of SI joint and lumbar spine); 3) Normally fires BEFORE limb movements (anticipatory feedforward activation) — this anticipatory activation is DELAYED in chronic LBP. Testing: abdominal draw-in maneuver; real-time ultrasound imaging of the lateral abdominal wall.

├— PHYSIOLOGY

277. Semmes-Weinstein monofilament 5.07 (10g) is used clinically as the threshold for:

A. Normal sensation

B. Loss of protective sensation — inability to detect it indicates high risk for foot ulcers in diabetic neuropathy

C. Deep pressure sensation

D. Proprioception

✓ **Answer: B**

💡 **Rationale & Explanation:**

The 5.07 (10g) Semmes-Weinstein monofilament: inability to feel this monofilament = LOSS OF PROTECTIVE SENSATION. Clinical use: annual diabetic foot screening; post-peripheral nerve injury sensory recovery monitoring; CRPS assessment. Normal threshold: 3.84 (0.07g). Loss of 5.07 = high ulceration risk → patient education on daily foot inspection, protective footwear, referral to podiatry. The test is applied perpendicular to the skin surface, buckled for 1-1.5 seconds, at 10 plantar sites.

├— ANATOMY

278. **The 'first ray' of the foot consists of:**

A. Only the 1st metatarsal

B. The medial cuneiform and 1st metatarsal — the functional unit including the 1st tarsometatarsal joint

C. The navicular and 1st metatarsal

D. The calcaneus and 1st metatarsal

✓ Answer: B

💡 **Rationale & Explanation:**

First ray = medial cuneiform + 1st metatarsal. FUNCTION: critical for the windlass mechanism (great toe dorsiflexion → tightens plantar fascia via the first ray → arch elevation → rigid lever for push-off). FIRST RAY HYPERMOBILITY: excessive movement of the first ray → inadequate medial arch support → compensatory pronation → hallux valgus; peroneus longus (which plantarflexes the first ray) becomes relatively ineffective. Assessment: Jack's test (great toe dorsiflexion + arch elevation observation).

PATHOLOGY

279. **'Quadriceps avoidance gait' is seen in patients who:**

A. Have strong quadriceps

B. Avoid activating the quadriceps because of pain or instability — using a forward trunk lean and hip extensor strategy to stabilize the knee instead

C. Have normal knee function

D. Have ankle instability

✓ Answer: B

💡 **Rationale & Explanation:**

Quadriceps avoidance gait: the patient reduces quad activation to avoid pain (knee OA, patellar pain) or to reduce anterior tibial shear

(ACL-deficient knees). COMPENSATION: forward trunk lean → gravity anterior to knee creates extension torque without quad activation; the GRF moves anterior to the knee → no flexion moment → no quad needed. Presents as flat foot contact, minimal knee flexion in stance, forward trunk lean, sometimes hyper-extended knee. PT: address the underlying cause (pain, fear); progressive quad strengthening; neuromuscular retraining.

KINESIOLOGY

280. 'Passive insufficiency' of a two-joint muscle occurs when:

A. The muscle is maximally contracted

B. The muscle is passively lengthened over both joints simultaneously until it reaches its maximum passive length — limiting further joint motion

C. The muscle develops a trigger point

D. The muscle is stimulated electrically

✓ Answer: B

💡 **Rationale & Explanation:**

Passive insufficiency: when a biarticular muscle is passively LENGTHENED over BOTH joints it crosses simultaneously, it reaches its maximum passive length and limits further motion. Example: hamstrings — fully flexing the hip while extending the knee simultaneously creates passive insufficiency (the SLR test). Compare: ACTIVE INSUFFICIENCY = when a biarticular muscle is shortened over both joints simultaneously (e.g., trying to flex the knee fully while extending the hip — the hamstrings become too short to develop adequate tension). These concepts are fundamental to understanding two-joint muscle mechanics.

PATHOLOGY

281. The 'Spurling's cluster' for cervical radiculopathy achieves the highest post-test probability with:

A. Spurling's test alone

B. 4 positive tests: Spurling's + distraction relieves pain + ULTT positive + ipsilateral cervical rotation <60°

C. McMurray test positive

D. SLR positive

✓ Answer: B

💡 **Rationale & Explanation:**

Wainner's cervical radiculopathy cluster (2003): 4 criteria give LR+ = 30.3 (nearly diagnostic): 1) Spurling's test positive; 2) Distraction test relieves arm pain; 3) ULTT-A positive; 4) Ipsilateral cervical rotation <60°. If 3/4 positive: LR+ = 6.1. This cluster demonstrates the power of combining tests rather than relying on any single test. Essential knowledge for Philippine PT boards — diagnostic clusters and clinical prediction rules appear regularly in examination questions.

ANATOMY

282. The 'long thoracic nerve' injury produces:

A. Deltoid paralysis

B. Winged scapula — the medial border of the scapula protrudes from the chest wall because the serratus anterior is paralyzed

C. Wrist drop

D. Elbow flexion weakness

✓ Answer: B

💡 **Rationale & Explanation:**

Long thoracic nerve (C5-C6-C7) innervates the serratus anterior. Injury: during axillary lymph node dissection, shoulder surgery, heavy backpack traction, or prolonged lateral lying. Result: WINGED SCAPULA

(medial border prominence, especially during wall push-up). Functional consequence: impaired upward scapular rotation → limited shoulder elevation. Compare with CN XI injury (spinal accessory nerve) = lateral winging + shoulder drop. PT: nerve injury recovery may take months; cannot strengthen a denervated muscle; monitor for reinnervation.

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283. The 'anterior interosseous nerve' (AIN) syndrome presents with:

A. CTS symptoms

B. Inability to flex the distal phalanx of the index finger and thumb (cannot make the OK sign) — without sensory loss, because AIN is purely motor

C. Wrist drop

D. Ulnar claw

✓ Answer: B

💡 **Rationale & Explanation:**

AIN is a PURELY MOTOR branch of the median nerve innervating FDP to index and middle fingers, FPL, and pronator quadratus. Syndrome: pinch weakness — DIP joints of index and thumb cannot flex → patient makes a pinch (straight fingers) rather than a rounded 'O'. NO SENSORY LOSS (AIN = motor only). Compare: CTS = median nerve at wrist = sensory symptoms + thenar weakness. AIN can be compressed in proximal forearm by fibrous bands or deep head of pronator teres.

├— PHYSIOLOGY

284. The 'myotatic reflex' (stretch reflex) arc is classified as:

A. Polysynaptic (multiple synapses)

B. Monosynaptic — Ia afferent from muscle spindle synapses DIRECTLY on the alpha motor neuron in the ventral horn

C. Disynaptic (two synapses)

D. Supraspinal (requires brain involvement)

✓ **Answer: B**

💡 **Rationale & Explanation:**

The myotatic (stretch) reflex: MONOSYNAPTIC — only ONE synapse in the entire arc. Sequence: muscle stretch → muscle spindle (Ia afferent) → dorsal horn → DIRECTLY synapses on alpha motor neuron in ventral horn → efferent to the muscle → contraction. No brain involvement in the arc itself (though supraspinal centers modulate it). Clinical: deep tendon reflexes ARE stretch reflexes. Hyperreflexia in UMN lesions results from loss of normal descending inhibition on the Ia inhibitory interneurons.

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285. 'Reciprocal inhibition' in neurophysiology means:

A. Both agonist and antagonist contract simultaneously

B. When the agonist contracts, an inhibitory interneuron simultaneously INHIBITS the antagonist — allowing smooth, coordinated movement

C. Pain inhibits all muscle activity

D. The agonist is inhibited during rapid movement

✓ **Answer: B**

💡 **Rationale & Explanation:**

Reciprocal inhibition: the Ia afferent from the muscle spindle sends a collateral branch to an Ia INHIBITORY INTERNEURON, which synapses on the ANTAGONIST alpha motor neuron → antagonist is inhibited (relaxed) while the agonist contracts. This prevents co-contraction that would resist the movement. CLINICAL: PNF Contract-Relax-Agonist-Contract uses reciprocal inhibition — contracting the agonist inhibits the tight antagonist → increases stretch range. Spastic co-contraction in UMN lesions overrides normal reciprocal inhibition.

KINESIOLOGY

286. The 'stoop test' for lumbar spinal stenosis is POSITIVE when:

A. Back pain occurs during testing

B. LEG PAIN is reproduced with sustained extension (walking/standing) and RELIEVED by forward bending (stooping) — confirming neurogenic claudication

C. Arm pain is reproduced

D. Back pain worsens only

✓ Answer: B

💡 **Rationale & Explanation:**

Stoop test: patient walks until leg symptoms appear (neurogenic claudication from spinal stenosis); then stoops forward (lumbar flexion). POSITIVE: symptoms RELIEVE with stooping. Mechanism: extension narrows the spinal canal → nerve root compression → claudication; flexion widens the canal → relief. 'Shopping cart sign' = spontaneous version. VASCULAR claudication: relieved by standing still, not flexion. Differentiation: neurogenic = relieved by flexion; vascular = relieved by rest; ABI for vascular confirmation.

ANATOMY

287. The 'annular ligament' of the elbow holds the radial head in the radial notch and allows:

A. Elbow flexion only

B. Forearm rotation (pronation/supination) — the radius spins within the annular ligament ring

C. Elbow extension

D. Wrist flexion

✓ Answer: B

💡 **Rationale & Explanation:**

Annular ligament: ring-shaped ligament encircling the radial head, attaching both ends to the anterior and posterior margins of the radial notch of the ULNA. It allows the radial head to ROTATE (pivot) within

the proximal radioulnar joint during pronation/supination. NURSEMAID'S ELBOW: in children <5 years, sudden longitudinal traction on a pronated forearm pulls the radial head out of the loosely attached annular ligament. Treatment: supination + elbow flexion to reduce. After age 5-6, the annular ligament tightens and this becomes rare.

KINESIOLOGY

288. The 'windlass mechanism' of the foot is activated by:

A. Heel strike

B. Toe dorsiflexion (especially the hallux) during push-off — tightening the plantar fascia and elevating the medial longitudinal arch

C. Ankle plantarflexion only

D. Midstance weight bearing

✓ Answer: B

💡 **Rationale & Explanation:**

Windlass mechanism (Hicks, 1954): during terminal stance and pre-swing, the hallux dorsiflexes as the heel rises. This wraps the plantar fascia around the metatarsal heads → plantar fascia TIGHTENS → ELEVATES the medial longitudinal arch → STIFFENS the foot into a rigid lever for push-off. In hallux rigidus (limited 1st MTP dorsiflexion): windlass mechanism fails → poor push-off, altered gait, increased plantar fascia stress. Plantar fasciitis can be worsened by windlass loading. Understanding this mechanism is crucial for orthotics design and plantar fasciitis rehabilitation.

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289. The 'close-packed position' for the ankle joint is:

A. Plantarflexion

B. Maximum dorsiflexion — the wider anterior talus is fully engaged in the mortise, providing maximum bony congruence and ligamentous tension

C. Neutral (0°)

D. Inversion

✓ **Answer: B**

💡 **Rationale & Explanation:**

Ankle close-packed position: MAXIMUM DORSIFLEXION. The TALUS is wider anteriorly — in dorsiflexion, the wider anterior talus presses firmly into the ankle mortise → maximum BONY CONGRUENCE → maximum stability. The ankle is most vulnerable in PLANTARFLEXION + INVERSION (loose-packed, narrower talus in the mortise, lax ligaments) — the classic ankle sprain mechanism. Loose-packed (resting) position: ~10° plantarflexion and slight inversion — used for joint mobilization techniques.

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290. In the 'concave-convex rule' for the shoulder, during abduction the humeral head (convex) glides in which direction?

A. Same direction as arm motion (superiorly)

B. Opposite to arm motion — the humeral head GLIDES INFERIORLY as the arm abducts superiorly; for restricted shoulder abduction, apply inferior glide of the humeral head

C. Medially

D. Anteriorly

✓ **Answer: B**

💡 **Rationale & Explanation:**

Convex surface (humeral head) moving on concave surface (glenoid): arthrokinematic glide is OPPOSITE to the bone motion. During shoulder ABDUCTION (arm moves superiorly): humeral head rolls superiorly AND GLIDES INFERIORLY simultaneously. Without the inferior glide, the humeral head would ride off the glenoid superiorly. For restricted abduction → apply INFERIOR glide mobilization to restore the missing arthrokinematic component. This is the most commonly tested shoulder mobilization principle on Philippine PT boards.

PATHOLOGY

291. The primary mechanism of 'non-contact ACL injury' in female athletes is:

A. Direct knee impact

B. Deceleration, pivoting, or landing with the knee near extension (15-30°) in VALGUS COLLAPSE — the ACL is maximally stressed at near-full extension during sudden deceleration

C. Hyperflexion

D. Running in a straight line

✓ Answer: B

💡 Rationale & Explanation:

Non-contact ACL mechanism (~70% of all ACL tears): knee near extension (15-30°) + valgus collapse + internal tibial rotation + sudden deceleration or landing from a jump. Risk factors in females: wider pelvis → increased valgus angle; less neuromuscular protection; hormonal ligament laxity. Prevention programs (FIFA 11+, PEP): neuromuscular training targeting landing mechanics + gluteus medius strengthening → reduces ACL tear rates by 50-80%.

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292. The Ottawa foot rules indicate X-ray when there is bone tenderness at:

A. Any midfoot pain

B. Base of 5th metatarsal OR navicular bone, OR inability to weight-bear 4 steps

C. Soft tissue swelling only

D. Any pain with dorsiflexion

✓ Answer: B

💡 Rationale & Explanation:

Ottawa Foot Rules: X-ray indicated if: 1) Bone tenderness at the BASE OF THE 5TH METATARSAL; 2) Bone tenderness at the NAVICULAR; 3) Inability to weight-bear (4 steps). Sensitivity ~99% for clinically

significant foot fractures. Key fractures detected: Jones fracture (proximal 5th MT diaphysis — requires different management from avulsion), navicular stress fracture. If all criteria negative: safely rule out fracture clinically.

ANATOMY

293. The 'accessory nerve' (CN XI) innervates:

A. Sternocleidomastoid only

B. Both the sternocleidomastoid AND upper trapezius — injury causes inability to shrug the shoulder (upper trapezius) and weakness of head rotation (SCM)

C. The brachial plexus

D. The rhomboids

✓ Answer: B

💡 **Rationale & Explanation:**

Spinal accessory nerve (CN XI): innervates SCM (head rotation to opposite side) and UPPER TRAPEZIUS (shoulder shrug, head extension). Injury: posterior triangle of neck surgery (lymph node biopsy, cancer surgery), carotid endarterectomy. Result: TRAPEZIUS PALSY — drooping shoulder, inability to shrug, shoulder pain, LATERAL scapular winging + shoulder drop. Distinguish: long thoracic nerve injury = MEDIAL border winging; CN XI injury = LATERAL winging + shoulder drop. Significant cause of shoulder disability after neck surgery.

KINESIOLOGY

294. The 'hip-knee-ankle angle' (mechanical axis) on standing AP X-ray is used to assess:

A. Hip flexor tightness

B. Lower limb alignment — line from femoral head center to ankle center; VALGUS = line passes lateral to knee center; VARUS = line passes medial to knee center

C. Muscle strength

D. Gait speed

✓ **Answer: B**

💡 **Rationale & Explanation:**

HKA angle (Mikulicz line): runs from center of femoral head to center of the ankle. Normal: passes through center of the knee (±0-3 mm). VALGUS (knock-knees): line lateral to knee → lateral compartment overloaded → lateral OA. VARUS (bow-legs): line medial to knee → medial compartment overloaded → medial OA (most common pattern). Used for: assessing knee OA distribution, planning osteotomies (high tibial osteotomy for varus), TKA alignment. Measured on full-leg standing (long cassette) X-rays.

├— PATHOLOGY

295. The 'biopsychosocial model' in musculoskeletal PT proposes that chronic pain results from:

A. Tissue damage alone

B. A complex interaction of BIOLOGICAL (nociception, tissue damage), PSYCHOLOGICAL (fear, catastrophizing, mood), and SOCIAL (work, culture, socioeconomic) factors

C. Psychological factors only

D. Social factors only

✓ **Answer: B**

💡 **Rationale & Explanation:**

Biopsychosocial model (Engel, 1977): replaced the purely biomedical model for pain. BIOLOGICAL: nociception, inflammation, central sensitization. PSYCHOLOGICAL: pain catastrophizing, kinesiophobia, depression, anxiety, expectations, prior pain experiences. SOCIAL:

work environment, compensation status, cultural beliefs, socioeconomic factors. All three interact: the same injury can produce very different disability depending on psychological state and social context. In PT: underpins pain neuroscience education, psychologically informed PT, yellow flag screening (STarT Back Tool), graded exposure therapy.

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296. **'Yellow flags' in musculoskeletal physiotherapy indicate:**

A. Serious pathology requiring immediate referral

B. Psychosocial risk factors for chronicity — poor recovery predictors including catastrophizing, fear-avoidance, low mood, unhelpful beliefs, work dissatisfaction

C. Vascular complications

D. Systemic infection

✓ Answer: B

💡 **Rationale & Explanation:**

Yellow flags (Kendall et al.): psychosocial factors predicting transition from acute to CHRONIC pain/disability. Categories: A = Attitudes (pain is harmful, rest essential); B = Behavior (avoidance, excessive rest); C = Compensation (financial incentive for disability); D = Diagnosis conflicts (contradictory advice); E = Emotions (depression, anxiety, fear); F = Family (overprotective); W = Work (unsupportive employer, low satisfaction). 3+ yellow flags = significant psychosocial contribution → biopsychosocial management required. NOT a reason to dismiss the patient — these indicators guide the type of intervention needed.

ANATOMY

297. **The 'thenar eminence' is innervated primarily by:**

A. Ulnar nerve

B. Median nerve — recurrent motor branch innervating APB, opponens pollicis, FPB (superficial head)

C. Radial nerve

D. Anterior interosseous nerve

✓ **Answer: B**

💡 **Rationale & Explanation:**

Thenar muscles: APB (Abductor Pollicis Brevis), OP (Opponens Pollicis), FPB superficial head = MEDIAN NERVE recurrent motor branch. The recurrent branch loops around the distal flexor retinaculum. In severe CTS: this branch is compressed → THENAR ATROPHY. Compare: hypothenar (ADM, FDM, ODM) = ULNAR NERVE. Memory: Median = Middle = Thumb (thenar) side; Ulnar = ulnar/little finger side.

├— PHYSIOLOGY

298. The oxygen dissociation curve 'left shift' is caused by:

A. High altitude training

B. Alkalosis, decreased CO2, decreased temperature, decreased 2,3-DPG — hemoglobin holds O2 more tightly and releases it less readily

C. Exercise-induced hyperthermia

D. Increased metabolic rate

✓ **Answer: B**

💡 **Rationale & Explanation:**

Left shift: ALKALOSIS (pH ↑), DECREASED CO2, DECREASED TEMPERATURE, DECREASED 2,3-DPG. Hemoglobin holds O2 tightly → does not readily release to tissues. Clinical scenarios: fetal hemoglobin (naturally left-shifted, picks up O2 from maternal HbA); stored blood (decreased 2,3-DPG); alkalosis (hyperventilation); hypothermia. CO poisoning causes a severe left shift — doubly dangerous as CO also competes with O2 for hemoglobin binding. A left-shifted curve can cause tissue hypoxia despite adequate SpO2 readings.

├— KINESIOLOGY

299. **The 'Codman pendulum exercises' work by:**

A. Strengthening the rotator cuff

B. Using GRAVITY and the arm's weight to provide gentle traction and distraction of the glenohumeral joint — passive, non-muscular movement to reduce pain and maintain ROM

C. Compressing the subacromial space

D. Actively exercising the deltoid

✓ Answer: B

💡 **Rationale & Explanation:**

Codman (Codman-Depalma) pendulum exercises: patient leans forward (table support with unaffected arm). The AFFECTED ARM HANGS FREELY — gravity provides gentle LONGITUDINAL TRACTION. Patient sways the TRUNK gently to produce passive circular, forward-backward, and side-to-side movements. BENEFITS: joint distraction reduces intra-articular pressure (analgesic); maintains ROM in early post-rotator cuff repair phase; reduces muscle guarding through gentle movement; promotes synovial fluid circulation. KEY: movement comes from TRUNK SWAY, not shoulder muscle activation. Used in: post-rotator cuff repair, frozen shoulder early phase, acute shoulder injuries.

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300. **The 'valgus extension overload' syndrome in overhead throwing athletes involves which TRIAD of elbow pathology?**

A. Lateral epicondylitis only

B. Medial tension (UCL stretching) + lateral compression (radiocapitellar) + posterior impingement (olecranon-olecranon fossa) — all occurring simultaneously during the acceleration phase of throwing

C. Posterior capsule tightness only

D. Medial nerve compression only

✓ Answer: B

💡 **Rationale & Explanation:**

Valgus extension overload (VEO) in throwers: during ACCELERATION, massive valgus torque (~64 Nm) creates SIMULTANEOUSLY: MEDIAL TENSION: UCL stretched → the most common elbow injury in throwing athletes. LATERAL COMPRESSION: radiocapitellar joint compressed → osteochondral defects, loose bodies. POSTERIOR IMPINGEMENT: posteromedial olecranon tip impacts olecranon fossa → osteophyte formation. Treatment: UCL reconstruction ('Tommy John') for UCL tears; osteophyte excision for posterior impingement; PT: return to throwing program, neuromuscular control, kinetic chain conditioning.

S2
Clinical Sciences I: Musculoskeletal Physical Therapy
Orthopedics, Sports, Manual Therapy & Rehabilitation

ORTHOPEDIC ASSESSMENT

1. The Neer impingement sign is performed by:

A. Passively abducting the arm to 90° with internal rotation

B. Passively forward flexing the arm with forearm pronated and elbow extended

C. Resisted shoulder abduction at 90° in the scapular plane

D. Horizontal adduction across the chest

✓ Answer: B

💡 **Rationale & Explanation:**

The Neer impingement sign: the examiner stabilizes the scapula and passively forward-flexes the patient's arm (elbow extended, forearm pronated) in a smooth arc. POSITIVE = pain in the shoulder, especially between 70-120°. The pronated forearm forces the greater tuberosity under the acromion, reproducing the impingement. The Hawkins-Kennedy test (arm at 90° flexion, then internally rotated) is another impingement test. Neer's test has sensitivity ~72% and specificity ~66%.

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2. Phalen's test for carpal tunnel syndrome is positive when:

A. Direct percussion over the carpal tunnel produces tingling

B. Maximum wrist flexion for 60 seconds reproduces numbness/tingling in the thumb, index, and middle fingers

C. Sustained wrist extension reproduces symptoms

D. Resisted thumb abduction produces pain

✓ Answer: B

💡 **Rationale & Explanation:**

Phalen's test: the patient holds MAXIMUM WRIST FLEXION (gravity helps — let the wrists drop naturally) for up to 60 seconds. Positive = numbness or tingling in the median nerve distribution (thumb, index, middle, radial half of ring finger). The mechanism: wrist flexion increases pressure within the carpal tunnel, compressing the median nerve. Sensitivity ~68%, specificity ~73%. The combination of Phalen's + Tinel's + night symptoms is highly suggestive of CTS.

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3. The McMurray test is used to assess:

A. ACL integrity

B. Meniscal integrity

C. PCL integrity

D. LCL integrity

✓ Answer: B

💡 **Rationale & Explanation:**

McMurray test = meniscal assessment. Technique: patient supine, fully flex the knee, then apply valgus + external rotation (medial meniscus) or varus + internal rotation (lateral meniscus) while slowly extending the knee. POSITIVE = palpable or audible CLICK/CLUNK at the joint line — a torn meniscal flap being caught between the femoral condyle and tibial plateau. Joint line tenderness is actually the most sensitive sign of meniscal injury (~75-85%). Thessaly test (standing twisting) is more sensitive (~94%) for meniscal tears.

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4. FABER test is positive when:

A. Pain in the groin = hip pathology; pain in the sacroiliac region = SIJ pathology

B. Pain only when the knee is fully extended

C. Tingling down to the foot = nerve root involvement

D. Pain in the greater trochanter = trochanteric bursitis

✓ **Answer: A**

💡 **Rationale & Explanation:**

FABER test (hip Flexion, ABduction, External Rotation) has two possible pain locations: GROIN PAIN or anterior hip pain = intra-articular hip pathology (labral tear, hip OA, femoral neck stress fracture). POSTERIOR hip/SACROILIAC pain = SIJ dysfunction. The test compresses the hip joint AND stresses the SIJ — making it useful for both. It's one of the SIJ provocation tests used in a cluster (with distraction, compression, thigh thrust, Gaenslen's). A cluster of 3+ positive SIJ tests has high specificity for SIJ dysfunction.

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5. The Spurling's test (cervical compression test) is positive when:

A. Neck flexion causes radicular symptoms

B. Lateral flexion + rotation + axial compression toward the symptomatic side reproduces radicular arm pain

C. Neck extension causes bilateral arm tingling

D. Resisted neck flexion causes pain

✓ **Answer: B**

💡 **Rationale & Explanation:**

Spurling's test: position the patient's head in lateral flexion + rotation toward the PAINFUL side, then apply gentle downward (axial) compression. POSITIVE = reproduction of radicular arm pain (not just local neck pain). Mechanism: narrows the neural foramen on the ipsilateral side, compressing the irritated nerve root. Sensitivity ~77%, specificity ~92% — one of the most specific tests for cervical radiculopathy. The distraction test (relieving arm pain with traction) + Spurling's + upper limb tension tests form a diagnostic cluster.

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6. The Ober test assesses tightness of which structure?

A. Piriformis muscle

B. Iliotibial band (ITB) and tensor fasciae latae (TFL)

C. Adductor longus

D. Rectus femoris

✓ **Answer: B**

💡 **Rationale & Explanation:**

Ober test: patient sidelying, examiner abducts and extends the hip, then slowly lowers it (adducts). Positive = the hip/knee does NOT drop below horizontal when released (the ITB/TFL prevents adduction). The ITB is a thick fibrous band running from the ilium to Gerdy's tubercle on the lateral tibia. Tight ITB causes iliotibial band syndrome (lateral knee pain), trochanteric bursitis, and lateral hip pain. Treatment: foam rolling, hip abductor strengthening, and lower extremity alignment correction.

├— MANUAL THERAPY

7. Maitland's joint mobilization Grade III involves:

A. Small amplitude movement at the beginning of range

B. Large amplitude movement at the END of range

C. Small amplitude movement at the beginning or end of range for pain

D. High velocity thrust

✓ **Answer: B**

💡 **Rationale & Explanation:**

Maitland's grades: I = small amplitude, beginning of range (pain relief); II = large amplitude, beginning to mid-range (pain relief, no tissue resistance); III = large amplitude, INTO tissue resistance at END of range (stretches tissues); IV = small amplitude, at END of range (detailed stretch, joint play); V = manipulation (HVLAT thrust). Grades I and II = primarily for PAIN; Grades III and IV = primarily for STIFFNESS. Apply this when patients have different problems — don't use grade III/IV on an irritable, painful joint!

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8. The McKenzie method classifies the POSTURAL syndrome as:

A. Pain with repeated movement testing and directional preference

B. Constant pain with no pain-free positions

C. Pain that appears ONLY at end-range sustained positions and disappears immediately on position correction

D. Pain reproduced by all movements in all directions

✓ Answer: C

💡 **Rationale & Explanation:**

McKenzie's three syndromes: Postural = pain ONLY at END-RANGE SUSTAINED POSTURES (e.g., sitting too long in flexion), NO pain with movement, and pain DISAPPEARS IMMEDIATELY when you correct posture. Dysfunction = pain at end range movement, caused by adaptive shortening. Derangement = the main syndrome (most patients with disc involvement); shows a DIRECTIONAL PREFERENCE — repeated movement in one direction centralizes pain. McKenzie treatment is based on identifying the directional preference.

---

9. 'Centralization' in the McKenzie method means:

A. Pain moves from the spine to the extremity

B. Pain moves from the extremity toward the midline of the spine

C. Pain becomes centralized (constant and severe)

D. Patient focuses on central rather than peripheral symptoms

✓ Answer: B

💡 **Rationale & Explanation:**

Centralization (coined by McKenzie): referred or peripheral pain moves FROM the extremity/buttock/leg TOWARD the spine (midline) during repeated movement testing. It's a GOOD SIGN — it means the disc herniation is reducible, nerve root irritation is improving, and the treatment direction is correct. 'Peripheralization' is the OPPOSITE — pain moves distally = you're moving in the WRONG direction; reverse your approach. Research shows centralization is highly predictive of good outcomes with conservative management.

SPORTS REHABILITATION

10. Plyometric training is characterized by which type of muscle action?

A. Isometric only

B. Concentric only

C. Stretch-shortening cycle (eccentric followed by concentric)

D. Eccentric only

✓ Answer: C

💡 **Rationale & Explanation:**

Plyometrics = stretch-shortening cycle (SSC): rapid ECCENTRIC loading (landing/deceleration) followed immediately by an EXPLOSIVE CONCENTRIC contraction. The key is the AMORTIZATION PHASE — the transition between eccentric and concentric. The shorter this phase, the more elastic energy is stored in the muscle-tendon unit and returned in the concentric phase (like a spring). Plyometric training improves rate of force development (RFD), reduces ACL injury risk, and enhances athletic power.

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11. According to criteria for return to sport after ACL reconstruction, which component is MOST important?

A. Time since surgery only (9 months minimum)

B. MRI showing complete graft ligamentization

C. Multi-criteria assessment: limb symmetry index (LSI) ≥90% for strength AND hop tests + psychological readiness

D. Absence of pain with jogging

✓ Answer: C

💡 **Rationale & Explanation:**

Current evidence supports a MULTI-CRITERIA approach to ACL RTS: Time (≥9-12 months), Strength (quadriceps and hamstring LSI ≥90% on isokinetic testing), Functional hop tests (single hop, triple hop, crossover hop — LSI ≥90%), Psychological readiness (ACL-RSI questionnaire ≥65%), and absence of effusion/full ROM. The old '6-

month rule' alone is insufficient — athletes cleared by time alone have 15x higher re-tear rate. Quadriceps LSI is the single strongest predictor.

---

12. The PRICE protocol for acute musculoskeletal injury management stands for:

A. Pressure, Rest, Ice, Compression, Elevation

B. Protection, Rest, Ice, Compression, Elevation

C. Padding, Rest, Icing, Circulation, Exercise

D. Protection, Resistance, Isometrics, Compression, Elevation

✓ Answer: B

💡 **Rationale & Explanation:**

PRICE = Protection + Rest + Ice + Compression + Elevation. Updated frameworks include POLICE (Optimal Loading, Ice, Compression, Elevation with Protection) and PEACE & LOVE (2019): Protection, Elevation, Avoid anti-inflammatories, Compression, Education; followed by Load, Optimism, Vascularization, Exercise. The evolving evidence suggests that while ice/NSAIDs reduce pain, they may DELAY healing by suppressing the inflammatory cascade needed for tissue repair. For examination purposes, PRICE remains the most tested protocol on Philippine PT boards.

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13. A Grade II ankle sprain involves:

A. Microscopic tears, no instability, minimal swelling

B. Partial ligament tear with moderate swelling, tenderness, and some instability

C. Complete ligament tear with significant instability and inability to weight-bear

D. Avulsion fracture of the lateral malleolus

✓ Answer: B

💡 **Rationale & Explanation:**

Ankle sprain grading: Grade I = Microscopic tears, intact ligament, no instability, able to weight-bear. Grade II = Partial tear, moderate swelling, ecchymosis, painful to weight-bear but can (with difficulty),

MILD-MODERATE instability. Grade III = Complete rupture, severe swelling/ecchymosis, significant instability (positive anterior drawer), unable to weight-bear. Most lateral ankle sprains are Grade I-II (ATFL involved first). Grade II: treat with PRICE, early mobilization, proprioception training, and progressive functional rehab.

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14. The gold-standard eccentric program for Achilles tendinopathy is:

A. Alfredson's heavy slow resistance protocol

B. Curwin and Stanish protocol

C. Alfredson heel drop protocol (eccentric calf raises on a declined board)

D. Isometric calf raise protocol

✓ Answer: C

💡 **Rationale & Explanation:**

Alfredson's eccentric heel drop protocol: Perform eccentric calf raises on a step/decline board, 3 sets × 15 reps, twice daily, 7 days/week, for 12 weeks. KEY: Train INTO pain (unlike most PT protocols) — the pain is expected and acceptable. One exercise with knee straight (targets gastrocnemius), one with knee bent (targets soleus). Eccentric loading promotes collagen synthesis and remodeling of disorganized tenocytes. This protocol showed 90%+ return to sport in Alfredson's original RCT.

├─ POSTURAL ANALYSIS

15. In anterior pelvic tilt, the typical muscle pattern in Janda's lower crossed syndrome is:

A. Tight hip flexors + weak hip flexors; tight glutes + weak hamstrings

B. Tight hip flexors + tight lumbar extensors; weak deep abdominals + weak gluteus maximus

C. Tight hamstrings + tight glutes; weak hip flexors + weak abdominals

D. Tight adductors + weak abductors; tight TFL + weak gluteus medius

✓ **Answer: B**

💡 **Rationale & Explanation:**

Janda's Lower Crossed Syndrome: TIGHT = hip flexors (iliopsoas, rectus femoris) + lumbar extensors (erector spinae). WEAK = deep abdominals (transversus abdominis, multifidus) + gluteus maximus. This creates an X-pattern across the lumbar-pelvic region resulting in anterior pelvic tilt + increased lumbar lordosis. Treatment: stretch hip flexors + lumbar extensors; strengthen glutes + deep core. Upper Crossed Syndrome involves tight pecs + upper traps; weak deep neck flexors + lower/mid traps — resulting in forward head posture.

ORTHOPEDIC REHABILITATION

16. Total hip arthroplasty (THA) precautions for a POSTERIOR approach include:

A. Avoid hip abduction and extension past 30°

B. Avoid hip flexion >90°, internal rotation, and adduction past midline

C. Avoid all hip flexion for 6 weeks

D. Avoid lateral rotation and abduction

✓ **Answer: B**

💡 **Rationale & Explanation:**

THA posterior approach precautions (to prevent posterior dislocation): No hip flexion >90° (don't lean forward in chair, no bending to pick things off the floor); No hip internal rotation; No hip adduction past midline (no crossing legs). The posterior approach violates the posterior capsule and external rotators — these need to be protected while healing. The anterior approach has fewer or NO precautions. PT role: patient education, ADL training (raised toilet seat, long-handled shoe horn, reacher), gait training, and progressive strengthening.

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17. When performing ultrasound over a metal implant, the therapist should:

A. Reduce the intensity to 0.5 W/cm² and proceed

B. Avoid using ultrasound directly over the metal implant

C. Use pulsed ultrasound only at 3 MHz

D. Apply ultrasound with a water bag over the area

✓ Answer: B

💡 **Rationale & Explanation:**

Metal implants are a CONTRAINDICATION to therapeutic ultrasound. The metal will preferentially absorb and concentrate the ultrasound energy, causing excessive heating around the implant and potential burns or tissue damage. The board exam answer is always AVOID IT. Other US contraindications: cancer, active infection, open wounds, eyes, skull, reproductive organs, cardiac area, thrombophlebitis, and growth plates in pediatric patients.

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18. The Berg Balance Scale (BBS) score of ≤45 out of 56 indicates:

A. Normal balance, no fall risk

B. Moderate fall risk — may benefit from assistive device

C. Independent ambulation is safe without supervision

D. Severe fall risk requiring wheelchair dependence

✓ Answer: B

💡 **Rationale & Explanation:**

Berg Balance Scale scoring: 0-20 = high fall risk; 21-40 = moderate fall risk; 41-56 = low fall risk. A score of 45 or below indicates significantly increased risk of falls. Each additional point below 54 is associated with a 3-4% increase in fall risk. The BBS has 14 tasks including sitting unsupported, standing unsupported, transfers, standing eyes closed, turning 360°, reaching forward, and picking up objects. Scores of 45-56 indicate increasing risk — consider fall prevention interventions.

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19. The Thomas test is used to assess:

A. Hip abductor strength

B. Hip flexor (iliopsoas and rectus femoris) tightness

C. Greater trochanter tenderness

D. Sacroiliac joint mobility

✓ **Answer: B**

💡 **Rationale & Explanation:**

Thomas test: patient supine, bring BOTH knees to chest, then lower the TEST leg to the table. Positive = the test leg DOES NOT fully lower flat to the table, indicating hip flexor tightness. Modification: knee extension of the lowered leg tests rectus femoris (if the knee bends when you lower the leg, it's tight). If the hip rises with the knee flexed = iliopsoas tight; if the knee bends = rectus femoris tight; if the leg abducts = TFL/ITB tight. A classic must-know test for the PT boards.

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20. Evidence-based shoulder impingement rehabilitation should include:

A. Heavy overhead pressing to strengthen the deltoid

B. Scapular stabilization (lower/middle trapezius, serratus anterior) + rotator cuff strengthening + postural correction

C. Aggressive stretching of the posterior capsule only

D. Complete rest and avoidance of all shoulder movement for 6 weeks

✓ **Answer: B**

💡 **Rationale & Explanation:**

Evidence-based shoulder impingement rehab addresses ALL causes: 1) Rotator cuff strengthening (depression/compression of humeral head — prevents superior migration): emphasize supraspinatus (empty can/full can), infraspinatus/teres minor (external rotation). 2) Scapular stabilization (normal scapulohumeral rhythm): lower/middle trapezius, serratus anterior. 3) Posterior capsule stretching if posterior tightness is present. 4) Postural correction (thoracic extension). Complete rest is counterproductive — early controlled loading promotes tissue healing.

ORTHOPEDIC ASSESSMENT

21. The Trendelenburg test is positive when, during single-leg stance on the AFFECTED side, the pelvis:

A. Rises on the stance side

B. Drops on the non-stance (swing) side

C. Drops on the stance side

D. Remains level due to compensation

✓ Answer: B

💡 **Rationale & Explanation:**

Trendelenburg test: patient stands on ONE leg. Positive = the PELVIS DROPS on the NON-STANCE (opposite) SIDE. The stance-side gluteus medius should contract to HOLD the pelvis level. If the Gmed is weak or the hip is painful, it can't hold up the opposite side — the pelvis sags. In gait, this produces a 'Trendelenburg gait' or 'gluteus medius lurch.' Causes: hip OA, neurological conditions affecting Gmed, superior gluteal nerve palsy. Do not confuse: the POSITIVE side is the STANCE side; the DROP is on the NON-STANCE side.

├— MANUAL THERAPY

22. The Mulligan Concept 'Mobilization with Movement' (MWM) KEY principle is:

A. Sustained traction while patient actively moves the joint

B. Sustained accessory glide applied by the therapist while the patient performs an ACTIVE, previously PAINFUL movement — with ZERO pain

C. Passive oscillation while patient relaxes

D. HVLAT thrust during active patient movement

✓ Answer: B

💡 **Rationale & Explanation:**

Mulligan's MWM: The therapist applies a SUSTAINED PAINLESS ACCESSORY GLIDE (in the direction that corrects the minor positional fault) while the PATIENT ACTIVELY PERFORMS the previously painful/restricted movement. The critical rule: NO PAIN during the movement (if it hurts, the glide direction is wrong). Immediate

improvement in range and pain is the indicator of a correct MWM. Mulligan's philosophy: pain = wrong technique. Instant results = correct technique.

SPORTS REHABILITATION

23. SLAP lesion stands for:

A. Superior Labrum Anterior-Posterior tear

B. Superior Laxity Anterior Pull

C. Subscapularis Lesion with Anterior Pain

D. Subacromial Labral Avulsion Partial

✓ Answer: A

💡 Rationale & Explanation:

SLAP = Superior Labrum, Anterior to Posterior. It's a tear of the glenoid labrum that starts anteriorly and extends posteriorly, usually involving the biceps anchor (long head of biceps attaches to the superior labrum). Mechanism: throwing athletes (overhead deceleration), FOOSH, direct blow. Tests: O'Brien's active compression test (arm 90° flexed, 10° horizontal adduction, thumb down → pain with resisted flexion relieved with supination = positive SLAP). Type II SLAP is most common in throwing athletes.

MANUAL THERAPY

24. Strain-Counterstrain (SCS / Positional Release Therapy) technique involves:

A. High-velocity low-amplitude thrust at joint restriction

B. Moving the patient into the position of maximum COMFORT (shortening the stressed tissue) and holding 90 seconds

C. Sustained stretching into resistance for 30 seconds

D. Rhythmic oscillation at end-range to break adhesions

✓ **Answer: B**

💡 **Rationale & Explanation:**

Strain-Counterstrain: Find the TENDER POINT. Position the patient's body to SHORTEN the affected muscle/tissue (move AWAY from the restrictive barrier — the OPPOSITE of stretching). Hold for 90 seconds (allows inhibitory reflexes to 'reset' the muscle spindle). Slowly return to neutral. Recheck tender point — it should be reduced >70%. The theory: a muscle spindle in tonic activity is normalized by shortening it. It's very gentle — ideal for acute, highly irritable patients who can't tolerate aggressive treatment.

├— ORTHOPEDIC REHABILITATION

25. Proprioceptive Neuromuscular Facilitation (PNF) technique 'Hold-Relax' is based on which neurophysiological principle?

A. Reciprocal inhibition — contraction of agonist relaxes antagonist

B. Autogenic inhibition — GTO activation during sustained contraction relaxes the same muscle

C. Stretch reflex sensitization

D. Mechanical elongation of collagen fibers

✓ **Answer: B**

💡 **Rationale & Explanation:**

Hold-Relax (HR): the therapist moves the limb to end-range, then the patient performs an ISOMETRIC contraction of the TIGHT MUSCLE for 6-10 seconds. After release, the therapist moves to a NEW end-range. The neurophysiology: the sustained isometric contraction activates the Golgi Tendon Organ (GTO), which sends Ib inhibitory signals → AUTOGENIC INHIBITION (the contracting muscle is inhibited). After the contraction, the muscle is temporarily more relaxed → increased ROM. Contract-Relax-Agonist-Contract (CRAC) adds agonist contraction for reciprocal inhibition — most effective PNF stretching technique.

ORTHOPEDIC ASSESSMENT

26. The Ottawa knee rules indicate that X-ray is warranted in a knee injury patient with:

A. Pain with palpation of the quadriceps tendon

B. Age ≥55 years OR isolated patellar tenderness OR fibular head tenderness OR inability to flex ≥90° OR inability to weight-bear 4 steps

C. Pain with resisted knee extension

D. Positive Lachman test

✓ Answer: B

💡 **Rationale & Explanation:**

Ottawa Knee Rules indicate X-ray for: Age ≥55; Isolated patellar tenderness; Fibular head tenderness; Inability to flex knee to 90°; Inability to weight-bear (4 steps) both immediately and in the ED. These rules have ~97-99% sensitivity for clinically significant fractures — if NONE are positive, you can safely forgo X-ray. As a PT, knowing these rules helps you identify when to refer for imaging vs. treat conservatively.

ORTHOPEDIC REHABILITATION

27. McConnell taping for patellofemoral pain syndrome (PFPS) is applied to:

A. Medially tilt and laterally glide the patella

B. Medially glide and medially tilt the patella (correct lateral tilt/tracking)

C. Compress the patella against the femoral groove

D. Elevate the patella superiorly to reduce contact pressure

✓ Answer: B

💡 **Rationale & Explanation:**

McConnell patellar taping for PFPS: tape is applied to MEDIALLY GLIDE and MEDIALLY TILT the patella — correcting the excessive lateral tracking/tilting that contributes to lateral facet overload and pain. The tape temporarily re-positions the patella in the trochlear groove during exercise, allowing pain-free quadriceps strengthening (facilitating VMO activation). It's a FACILITATORY tape — it allows the patient to exercise and provides immediate feedback. Evidence shows McConnell taping reduces pain during exercise, improving rehabilitation outcomes.

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28. Optimal exercise for a patient with osteoporosis to reduce fracture risk and improve bone mineral density is:

A. Swimming and pool aerobics (non-impact)

B. Weight-bearing aerobic exercise + progressive resistance training

C. Passive stretching and yoga only

D. Complete bed rest until BMD normalizes

✓ Answer: B

💡 **Rationale & Explanation:**

WEIGHT-BEARING exercises (walking, dancing, hiking) + PROGRESSIVE RESISTANCE TRAINING are the gold standard for osteoporosis. The mechanical loading from weight-bearing stimulates osteoblast activity (bone formation). Swimming provides NO bone-loading benefit — it's non-weight-bearing. Avoid: high-impact exercises that increase fracture risk, spinal flexion exercises (vertebral compression fracture risk). Current guidelines: 30-60 min moderate-intensity weight-bearing exercise most days + resistance training 2-3x/week targeting spine and hip.

ORTHOPEDIC ASSESSMENT

29. The 'empty end-feel' (or absent end-feel) on passive ROM testing is most consistent with:

A. Healthy normal joint

B. Osteoarthritis

C. Suspected fracture or complete ligament rupture

D. Capsular tightness

✓ Answer: C

💡 Rationale & Explanation:

Cyriax's end-feels: Normal = bone-to-bone, Capsular (leathery), Soft tissue approximation (gradual, soft). Pathological = Spasm (sudden, hard), Springy block (spring rebound — loose body/meniscal tear), Empty end-feel (patient asks you to STOP before the anatomical limit — no tissue resistance reached; implies severe pain, suspected fracture, or acute joint disorder). Empty end-feel = RED FLAG. Stop the examination and refer if you encounter this, especially if there's been recent trauma.

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30. The Apley scratch test evaluates:

A. Glenohumeral abduction and extension

B. Shoulder internal rotation + adduction (behind-back reach) AND external rotation + abduction (behind-neck reach)

C. Acromioclavicular joint integrity

D. Shoulder flexion to 180°

✓ Answer: B

💡 Rationale & Explanation:

Apley scratch test has TWO components: 1) Reach BEHIND THE BACK (inferior/behind-back reach): tests INTERNAL ROTATION + ADDUCTION + EXTENSION — the hand should reach to approximately T5. Limited = subscapularis, posterior capsule tightness. 2) Reach BEHIND THE HEAD (superior/behind-neck reach): tests EXTERNAL ROTATION + ABDUCTION + FLEXION — hand should reach between the shoulder blades. This is a QUICK SCREEN — compare sides. For detailed quantification, use a goniometer for each motion individually.

MANUAL THERAPY

31. Kaltenborn traction grade II (loosening traction) is used for:

A. Testing joint mobility

B. Reducing pain and muscle guarding

C. Stretching the capsule

D. High-velocity manipulation

✓ Answer: B

💡 Rationale & Explanation:

Kaltenborn traction grades: Grade I = piccolo traction (neutralizes joint compression — used for testing); Grade II = loosening traction (takes up all slack, reaches tension — used to REDUCE PAIN and muscle guarding, excellent for acute painful joints); Grade III = stretching traction (beyond tissue resistance — stretches the capsule for HYPOMOBILITY). Kaltenborn's approach pairs TRACTION with GLIDES based on the concave-convex rule. Grade II is your 'gentle treatment grade' — safe for acutely painful, inflamed joints where Grade III would be too aggressive.

ORTHOPEDIC ASSESSMENT

32. The Watson test (scaphoid shift test) is positive indicating:

A. De Quervain's tenosynovitis

B. Scapholunate instability/ligament tear

C. Scaphoid fracture

D. Triangular fibrocartilage complex (TFCC) tear

✓ Answer: B

💡 Rationale & Explanation:

Watson test (scaphoid shift): examiner's thumb is placed over the SCAPHOID tuberosity, then the wrist is moved from ulnar to RADIAL

DEVIATION while the thumb maintains pressure. Positive = a painful CLUNK as the scaphoid shifts dorsally (subluxes), then relocates. This indicates SCAPHOLUNATE LIGAMENT TEAR — the most common carpal instability. Scapholunate dissociation is seen on X-ray as a gap between the scaphoid and lunate >3mm ('Terry-Thomas sign'). Different from anatomical snuffbox tenderness which tests for SCAPHOID FRACTURE.

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33. The Slump test is POSITIVE when:

A. Trunk slumping causes local lumbar pain only

B. Adding ankle dorsiflexion to the slumped position reproduces symptoms RELIEVED by neck extension

C. Passive SLR at 45° causes hamstring tightness

D. Trunk slumping causes knee pain with simultaneous neck flexion

✓ Answer: B

💡 **Rationale & Explanation:**

Slump test: patient sits at edge → slump thoracic/lumbar spine → flex cervical spine → extend one knee → dorsiflex ankle. At each step, check for symptom reproduction. POSITIVE = symptoms (sciatica, neural pain) reproduced with knee extension + ankle DF, that are RELIEVED by releasing NECK FLEXION. The relief with neck extension is the hallmark of neural tension — it shows symptoms are from neural tissue being stretched. The slump test is more sensitive than SLR for central/lower lumbar neural tension. Sensitivity ~84%, specificity ~83%.

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34. For an L4 nerve root compression, expected assessment findings include:

A. Weakness of EHL, sensory loss on dorsum of foot, no reflex change

B. Weakness of tibialis anterior, sensory loss on medial leg/foot, diminished patellar reflex

C. Weakness of gastrocnemius, sensory loss on lateral foot, absent Achilles reflex

D. Weakness of quadriceps only, no sensory change

✓ Answer: B

💡 **Rationale & Explanation:**

L4 nerve root: Motor = tibialis anterior (weakness → foot drop/difficulty with dorsiflexion), quadriceps (weak knee extension); Sensory = medial aspect of lower leg and medial foot; Reflex = patellar reflex DIMINISHED. L5: Motor = EHL (big toe extension); Sensory = dorsum of foot + lateral lower leg; Reflex = typically NO reflex change. S1: Motor = gastrocnemius (push-off weakness); Sensory = lateral foot + posterior calf; Reflex = Achilles reflex DIMINISHED. This L4-L5-S1 triad is among the MOST tested clinical content on the PRC PT board.

PEDIATRIC ORTHOPEDICS

35. Developmental dysplasia of the hip (DDH) in infants is SCREENED with:

A. Ober test and FABER test

B. Ortolani test (reduction) and Barlow test (dislocation)

C. Thomas test and modified Thomas test

D. Ultrasound only — clinical tests are unreliable

✓ **Answer: B**

💡 **Rationale & Explanation:**

DDH is screened in NEWBORNS with: Ortolani test (abduct the hips while lifting the trochanter — a CLUNK = dislocated hip REDUCING back in); Barlow test (adduct and push posteriorly — a CLUNK = hip being DISLOCATED out). After 3 months, these tests become less reliable. Later signs of missed DDH: asymmetric thigh folds, shortened limb, limited hip abduction, Trendelenburg gait. Treatment: Pavlik harness (0-6 months), closed/open reduction for older infants. PT role: parent education and post-reduction rehabilitation.

ORTHOPEDIC REHABILITATION

36. In patients with patellofemoral pain syndrome (PFPS), which exercise best activates the VMO while minimizing PFPS?

A. Full arc knee extension (OKC, 0-90°)

B. Terminal knee extension (TKE) and short arc quad exercises in limited range

C. Deep squats (>90° knee flexion)

D. Aggressive downhill running

✓ Answer: B

💡 **Rationale & Explanation:**

In PFPS, the patellofemoral contact area and joint reaction force increase with deep knee flexion. Terminal knee extension (TKE, last 30° of extension) and short arc quads minimize PFPS while activating the VMO (vastus medialis oblique). The VMO is important for medial patellar tracking, though recent research suggests the timing and coordination of VMO vs. VL is more important than hypertrophy alone. Hip strengthening (gluteus medius, external rotators) has strong evidence for PFPS — reducing dynamic valgus that loads the lateral patellofemoral joint.

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37. De Quervain's tenosynovitis involves which tendons?

A. Flexor pollicis longus and abductor pollicis longus

B. Abductor pollicis longus and extensor pollicis brevis in the first dorsal compartment

C. Extensor pollicis longus and extensor pollicis brevis

D. Flexor pollicis brevis and opponens pollicis

✓ Answer: B

💡 **Rationale & Explanation:**

De Quervain's tenosynovitis = inflammation of the tendons in the FIRST DORSAL COMPARTMENT of the wrist: Abductor Pollicis Longus (APL) + Extensor Pollicis Brevis (EPB). These tendons share a fibrous tunnel at the radial styloid. Pain: over the radial styloid, with pinching and gripping. Known as 'Mommy's thumb' from holding babies. Finkelstein's test: flex thumb across palm, then passively ulnar deviate

the wrist — positive = sharp pain at the first dorsal compartment. Treatment: thumb spica splint, corticosteroid injection, eccentric exercises.

ORTHOPEDIC ASSESSMENT

38. The pivot shift test for the knee evaluates:

A. PCL integrity during posterior tibial loading

B. ACL integrity — subluxation-reduction of the tibia as the knee moves from extension to flexion

C. Meniscal integrity with valgus-rotation stress

D. LCL integrity with varus loading

✓ Answer: B

💡 **Rationale & Explanation:**

Pivot shift test: with the patient supine, the examiner extends the knee while applying a valgus force and internal tibial rotation. With an ACL-deficient knee, the tibial plateau SUBLUXES anterolaterally. As the knee is flexed to ~30-40°, the IT band causes a SUDDEN REDUCTION (a visible/palpable CLUNK). This subluxation-reduction is the 'pivot shift.' It's pathognomonic for ACL insufficiency. The pivot shift is the MOST SPECIFIC test for functional ACL deficiency (~97-98% specific). The Lachman test is more sensitive (~85-98%).

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39. The Gaenslen test is positive when:

A. Pain is produced in the lumbar spine only

B. Hyperextension of one hip while the opposite hip is in maximum flexion produces SIJ pain

C. Sitting SLR reproduces SIJ pain

D. Standing on one leg for >30 seconds produces SIJ pain

✓ Answer: B

💡 **Rationale & Explanation:**

Gaenslen test: patient sidelying, the lower hip is hyperextended off the edge while the upper hip is flexed to the chest. Positive = pain in the SIJ region. Mechanism: torsional stress across the SIJ (one ilium rotated anteriorly, one posteriorly). It's part of the 5-test SIJ cluster (along with distraction, compression, FABER, thigh thrust). If 3 or more tests in the cluster are positive → high specificity for SIJ pain. The SIJ is responsible for approximately 15-25% of chronic low back pain.

MANUAL THERAPY

40. A hypomobile joint treated with Maitland Grade IV mobilization should show which response if treatment is correct?

A. Increased pain during and after treatment

B. No change in motion but pain relief

C. Progressive improvement in range of motion over sessions

D. Immediate complete restoration of full motion in one session

✓ Answer: C

💡 **Rationale & Explanation:**

For a hypomobile joint treated with Grade III or IV Maitland mobilization, the expected clinical response is: gradual, PROGRESSIVE improvement in range of motion over MULTIPLE SESSIONS. After each session, the joint should be slightly less restricted. Reassessment after each session is mandatory to track progress. It's unrealistic to expect full motion restoration in ONE session. If there's no improvement after 3-6 sessions, reconsider the diagnosis and approach.

ORTHOPEDIC ASSESSMENT

41. Yergason's test is specific for:

A. Rotator cuff tear

B. Biceps tendon pathology (bicipital tendinitis or biceps tendon subluxation)

C. Acromioclavicular joint pathology

D. Supraspinatus tendon integrity

✓ **Answer: B**

💡 **Rationale & Explanation:**

Yergason's test: patient's elbow at 90° flexion, forearm pronated, arm at the side. Examiner grasps the wrist and resists supination. Positive = pain in the BICIPITAL GROOVE (anterior shoulder), indicating bicipital tendinitis, or the biceps tendon SNAPS OUT of the groove (subluxation). Speed's test (resisted shoulder forward flexion with elbow extended and forearm supinated) also tests biceps but is more sensitive for SLAP lesions too. These are often tested together on the PRC boards.

ORTHOPEDIC REHABILITATION

42. Following a Colles' fracture of the wrist, the MOST common complication seen in physical therapy is:

A. Avascular necrosis of the lunate

B. Complex Regional Pain Syndrome Type 1 (CRPS-1)

C. Radial nerve palsy

D. Carpal tunnel syndrome only

✓ **Answer: B**

💡 **Rationale & Explanation:**

CRPS-1 (formerly called reflex sympathetic dystrophy/RSD) is the most feared and common complication after Colles' fracture. It presents with: burning pain out of proportion to the injury, vasomotor changes (skin color/temperature changes), sweating, trophic changes (shiny skin), allodynia (light touch is painful), and ROM loss. PT treatment: desensitization, mirror therapy, graded motor imagery, gentle ROM,

and pain education. Early mobilization post-fracture is the BEST PREVENTION of CRPS.

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43. The WOMAC (Western Ontario and McMaster Universities Osteoarthritis Index) is a patient-reported outcome specific to:

A. Lumbar spine disability

B. Hip and knee OA and arthroplasty

C. Upper extremity function

D. Neck disability

✓ Answer: B

💡 **Rationale & Explanation:**

WOMAC is the gold-standard patient-reported outcome measure (PROM) for hip and knee OA and arthroplasty. It measures: Pain (5 items), Stiffness (2 items), Physical Function (17 items). Lower score = better. Other region-specific PROMs to know: DASH = upper extremity; NDI = neck; ODI = lumbar spine; KOOS = knee (younger/sports); SF-36 = general health. PRC boards love matching the outcome measure to the correct patient population. WOMAC = OA/arthroplasty.

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44. In the McKenzie approach, the MECHANICAL DIAGNOSIS for a patient whose pain centralizes with lumbar extension recommends:

A. Williams flexion exercises

B. McKenzie extension exercises (prone press-ups, prone lying)

C. Core stabilization exercises in neutral

D. Manual traction in flexion

✓ Answer: B

💡 **Rationale & Explanation:**

McKenzie directional preference: if pain CENTRALIZES with EXTENSION (becomes more central, moves away from the leg toward the back) = extension is the preferred direction = treat with EXTENSION EXERCISES. Prone press-ups (cobra position) and prone lying are the initial McKenzie extension exercises. Williams flexion exercises are prescribed when patients centralize with FLEXION. The key clinical

decision: identify which direction centralizes pain, then prescribe exercises in THAT direction. Centralizing = good prognosis; peripheralizing = wrong direction, change approach.

ORTHOPEDIC ASSESSMENT

45. The apprehension test (Fairbank's) for patellar instability is positive when:

A. Patient has pain with resisted knee extension

B. Patient has pain with the J-sign during active knee extension

C. Examiner laterally displaces the patella and patient shows apprehension or grabs the examiner's hand

D. Patient has pain with compression of the patella against the femur

✓ Answer: C

💡 **Rationale & Explanation:**

Patellar apprehension test: with the knee at 30° flexion, the examiner gently pushes the patella LATERALLY. POSITIVE = the patient shows apprehension (anxiety, flinching, or physically grabs the examiner's hand) — fearing the patella will dislocate. Actual PAIN is less diagnostic than the APPREHENSION response. This test has high specificity for patellar instability/dislocation history (~>90%). Clark's test (patellar compression) is for patellofemoral pain syndrome, not instability.

ORTHOPEDIC REHABILITATION

46. Continuous passive motion (CPM) after total knee arthroplasty (TKA) is primarily used to:

A. Strengthen the quadriceps muscle

B. Prevent deep vein thrombosis through compression

C. Maintain joint ROM and reduce adhesion formation in the early post-operative period

D. Accelerate bone healing at the implant interface

✓ Answer: C

💡 **Rationale & Explanation:**

CPM after TKA passively moves the knee through a preset arc of motion, starting at 0-40° and progressing as tolerated. Primary goals: prevent adhesion and fibrosis formation, maintain articular cartilage nutrition (cyclic fluid movement), and preserve range of motion in the early post-op period. CPM does NOT strengthen muscles (it's passive). Current evidence shows CPM has modest benefits; it's often used in the first few days. The real work comes from active quadriceps exercises and physiotherapist-guided ROM work. Goal: reach 90° knee flexion by day 5-7 post-TKA.

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47. The joint protection principles for rheumatoid arthritis include all EXCEPT:

A. Using larger/stronger joints to perform tasks

B. Avoiding sustained gripping activities

C. Performing maximum-intensity resistance training to maintain strength

D. Using assistive devices to reduce joint loading

✓ Answer: C

💡 **Rationale & Explanation:**

Joint protection principles for RA: use LARGER, stronger joints for tasks; avoid sustained gripping or pinching; use adaptive equipment (lever door handles, enlarged utensils); maintain good posture; distribute loads over larger areas; avoid positions of deformity. Maximum-intensity resistance training is NOT joint protection — high loads stress already compromised joints and can worsen deformities. Exercise in RA should match disease activity level: gentle ROM/aerobic during flares, progressive resistance during remission.

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48. The typical functional goal for knee flexion before hospital discharge after TKA is:

A. 45° of knee flexion

B. 70° of knee flexion

C. 90° of knee flexion

D. 120° of knee flexion

✓ Answer: C

💡 **Rationale & Explanation:**

90° of knee flexion by discharge (typically 3-5 days post-TKA in current fast-track protocols) is the typical early goal. Why 90°? Because 90° allows: sitting comfortably in a chair, walking up/down stairs one step at a time, and most basic ADLs. Long-term goals: 105-110° for normal stair climbing (alternating feet), 115° for tying shoes, 120-130° for squatting. Patients who don't achieve 90° by 6-8 weeks are at risk for manipulation under anesthesia (MUA). Extension (full 0°) is just as important — monitor both.

ORTHOPEDIC ASSESSMENT

49. The Adson test for thoracic outlet syndrome (TOS) is positive when:

A. Passive cervical extension causes bilateral arm tingling

B. The radial pulse disappears or decreases when the arm is abducted, extended, and the patient turns the head toward the test arm and inhales

C. Downward traction on the arm reproduces symptoms

D. The Wright test (arm hyperabduction) causes hand tingling

✓ Answer: B

💡 **Rationale & Explanation:**

Adson test: patient rotates head TOWARD the tested arm, extends the neck, and takes a DEEP BREATH. Examiner monitors the radial pulse. Positive = radial pulse DISAPPEARS or diminishes, and/or paresthesias

are reproduced. The mechanism: scalene muscles compress the subclavian artery as it crosses the first rib. Other TOS tests: Roos test (elevated arm stress test — arms raised 90° and fingers opened/closed for 3 min), Wright test. Combination of tests increases diagnostic accuracy.

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50. Kinesiological taping applied with a 'decompression' technique is indicated for:

A. Muscle facilitation

B. Reducing edema and bruising by lifting the skin

C. Correcting patellar maltracking

D. Restricting ROM at the ankle

✓ Answer: B

💡 **Rationale & Explanation:**

Kinesio tape application techniques: Muscle facilitation (in the direction of muscle action, ~15-25% tension) — activates weak muscles; Muscle inhibition (opposite to muscle action) — for tight muscles; Decompression (star/fan pattern over the affected area) — lifts the skin, creating space in the interstitium, improving lymphatic drainage and reducing edema/bruising; Ligament/joint support (tension applied at the joint). The lifting effect theoretically decompresses pain receptors in the skin, which may also reduce pain acutely.

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51. The 'Valgus stress test' at the knee is used to assess:

A. ACL integrity

B. LCL integrity

C. MCL integrity

D. PCL integrity

✓ Answer: C

💡 **Rationale & Explanation:**

Valgus stress test: examiner applies a VALGUS force (lateral force, pushing the knee INWARD/medially) while the patient's ankle is

stabilized. The examiner palpates the MCL. Positive = pain and/or laxity (gapping) along the medial joint line. Test in FULL EXTENSION (stresses MCL + posterior capsule) and at 30° FLEXION (isolates MCL — relaxes posterior capsule). If positive in full extension AND 30° flexion → severe MCL injury + possible PCL or ACL involvement. If positive only at 30° → isolated MCL injury. The VARUS stress test assesses the LCL (lateral collateral ligament).

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52. Lachman test is considered more sensitive than the anterior drawer test for ACL assessment because:

A. It's performed at 90° knee flexion where the ACL is more taut

B. It's performed at 30° knee flexion where the hamstrings are more relaxed and the ACL is more isolated

C. It uses a larger force application

D. It tests the posterior capsule simultaneously

✓ Answer: B

💡 **Rationale & Explanation:**

Lachman test (30° knee flexion): the most SENSITIVE test for ACL tears (~85-98% sensitivity). At 30°: 1) The hamstrings are relaxed in this position (hamstrings tighten and substitute for ACL at 90°); 2) The posterior capsule is also more relaxed, allowing the ACL to be more specifically tested; 3) The posterior horn of the meniscus is less effective as a checkrein. The anterior drawer test (90° flexion) has lower sensitivity (~62-75%) because at 90°, the hamstrings, posterior capsule, and meniscal posterior horns can mask ACL insufficiency. Lachman = 30° = standard first test for ACL. Pivot shift = most specific test.

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53. During manual muscle testing (MMT) of hip abductors in sidelying, which muscle is being primarily assessed?

A. Gluteus maximus

B. Gluteus medius

C. Tensor fasciae latae

D. Iliopsoas

✓ **Answer: B**

💡 **Rationale & Explanation:**

Hip abduction in sidelying (top leg raises straight up against gravity): this is the standard MMT position for the GLUTEUS MEDIUS — the primary hip abductor. The top leg is the test leg; ensure no hip flexion or external rotation (which would engage the TFL instead of Gmed). The gluteus maximus is the hip EXTENSOR (not abductor). The TFL does contribute to abduction but also flexes the hip — to isolate Gmed, test with the hip in neutral or slight extension. Clinically: Gmed weakness is very common in lumbar pain, hip OA, and after hip surgery — always test and treat it.

├— MANUAL THERAPY

54. Joint mobilization using the CONVEX-ON-CONCAVE rule: when a convex surface moves on a fixed concave surface, the glide occurs in the:

A. Same direction as the bone movement

B. Opposite direction to the bone movement

C. Perpendicular to the bone movement

D. No glide occurs, only spin

✓ **Answer: B**

💡 **Rationale & Explanation:**

CONVEX-CONCAVE RULE: When a CONVEX surface moves on a fixed CONCAVE surface, the roll and glide occur in OPPOSITE directions. Example: humeral head (convex) moving on the glenoid (concave) during shoulder abduction — the bone (humerus) moves UP (rolls superiorly) while the contact point SLIDES DOWN (inferior glide). So to mobilize a stiff shoulder in abduction: apply an INFERIOR glide to the humeral head. When a CONCAVE surface moves on a fixed CONVEX surface: roll and glide are in the SAME direction. Example: tibia (concave tibial plateau) on femur — during knee extension, both the tibia and the glide move anteriorly.

ORTHOPEDIC REHABILITATION

55. In the management of lateral ankle sprains, proprioceptive/balance training is included because:

A. It strengthens the plantar flexors

B. It helps restore neuromuscular control and prevents re-injury by retraining the peroneal reflexes and ankle proprioceptors

C. It reduces edema in the lateral ankle

D. It increases dorsiflexion range of motion

✓ Answer: B

💡 **Rationale & Explanation:**

After lateral ankle sprain, the injured ligaments (ATFL, CFL) carry MECHANORECEPTORS (joint position receptors, velocity receptors). These are damaged in the sprain, disrupting PROPRIOCEPTION — the ability to sense ankle position and react quickly to perturbations. This explains the high re-injury rate of ankle sprains without proper rehab. Proprioceptive retraining (single-leg balance on stable → unstable surfaces, wobble board, balance disc, perturbation training) retrains the neural pathways and improves PERONEAL MUSCLE REACTION TIME — so the peroneals fire quickly to evert the ankle before it rolls over again. Balance training is one of the most evidence-based interventions for ankle sprain prevention.

SPORTS REHABILITATION

56. The concept of 'relative rest' in sports injury management means:

A. Complete immobilization of the injured body part for 6 weeks

B. Reducing the intensity and specificity of training while maintaining general fitness in non-injured areas

C. Resting the entire body for the duration of injury

D. Returning to sport at 50% intensity immediately

✓ **Answer: B**

💡 **Rationale & Explanation:**

Relative rest: MODIFY training rather than stopping completely. The injured area is protected, but the athlete maintains cardiovascular fitness, strength in unaffected areas, and mental readiness. Examples: ankle sprain patient does upper body training and pool running while the ankle heals; shoulder injury patient continues lower extremity training and cardiovascular conditioning. Benefits: prevents deconditioning, maintains blood flow and metabolic health, speeds psychological recovery, allows earlier return to sport. Complete immobilization leads to rapid muscle atrophy (begins within 72 hours), cardiovascular deconditioning, and bone density loss. Relative rest is the modern preferred approach over absolute rest.

ORTHOPEDIC ASSESSMENT

57. The patellar grind test (Clarke's test) for patellofemoral pain syndrome is performed by:

A. Tapping the patella to assess fluid

B. Pressing the patella into the femoral groove while asking the patient to contract the quadriceps

C. Laterally displacing the patella

D. Testing patellar mobility medially and laterally

✓ **Answer: B**

💡 **Rationale & Explanation:**

Clarke's test (patellar grind test): examiner pushes the patella INFERIORLY (distally) into the femoral trochlear groove while the patient is relaxed. Then the patient is asked to CONTRACT THE QUADRICEPS. Positive = pain or inability to maintain the contraction due to pain. Mechanism: the compression and friction of the patellar articular cartilage against the femoral trochlea reproduce the patient's

pain. Sensitivity is moderate (~39-49%), specificity is variable. Important: a positive Clarke's test is NON-SPECIFIC — asymptomatic individuals often test positive. Always correlate with history and other findings. The apprehension test (patellar instability) is a separate, distinct test.

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58. In the shoulder, the 'Sulcus sign' indicates:

A. Supraspinatus tear

B. Inferior glenohumeral instability — a sulcus (depression) appears below the acromion when downward traction is applied to the arm

C. AC joint separation

D. Subscapularis weakness

✓ Answer: B

💡 **Rationale & Explanation:**

Sulcus sign: with the patient sitting, the examiner applies downward (inferior) traction to the arm. POSITIVE = a SULCUS (indentation) appears between the humeral head and the acromion (the humeral head drops inferiorly, creating a visible groove). This indicates INFERIOR GLENOHUMERAL INSTABILITY — laxity of the inferior glenohumeral ligament. It's graded: Grade 1 = <1cm, Grade 2 = 1-2cm, Grade 3 = >2cm. It's common in multidirectional instability (MDI) patients (swimmers, gymnasts, throwing athletes) who have generalized joint laxity. Don't confuse with impingement (Neer's test) or rotator cuff testing.

├— ORTHOPEDIC REHABILITATION

59. Isokinetic exercise differs from isotonic exercise in that:

A. Isokinetic exercises use constant speed, accommodating resistance; isotonic uses constant resistance

B. Isokinetic exercises use constant resistance throughout the range

C. Isotonic exercises use constant speed throughout range

D. Isokinetic exercises can only be done eccentrically

✓ **Answer: A**

💡 **Rationale & Explanation:**

ISOKINETIC exercise: the velocity (speed) of movement is CONSTANT (controlled by the dynamometer); the RESISTANCE ACCOMMODATES to the effort applied at every point in the range (maximum resistance at every angle — the machine matches whatever force you apply). Used for: strength testing (Biodex, Cybex), post-surgical rehab, and research. ISOTONIC exercise: RESISTANCE is constant (e.g., a dumbbell weighs the same throughout the range) but the SPEED varies and the muscle force output varies (is not constant). Most gym exercises and PT exercises are isotonic. ISOMETRIC: no movement, constant length. ISOKINETIC testing is the gold standard for quadriceps/hamstring ratio assessment in ACL rehabilitation.

├— MANUAL THERAPY

60. Passive mobilization vs. manipulation (HVLAT): manipulation is characterized by:

A. Slow, gentle oscillations within the range

B. A high-velocity, low-amplitude thrust at or just beyond the end of the available range, often producing a 'pop'

C. Sustained traction for 5-10 minutes

D. Gentle end-range oscillations in Grade III

✓ **Answer: B**

💡 **Rationale & Explanation:**

Manipulation (HVLAT — High Velocity, Low Amplitude Thrust): a single, QUICK, very short-range thrust applied at or just beyond the end of available range. It's the maneuver that produces the audible 'pop' (cavitation — gas bubble collapse in the joint fluid). The thrust is so fast the patient can't voluntarily resist. Mobilization (Maitland Grades I-IV): oscillatory, rhythmic movements within or to the limit of range —

patient can stop them at any time. Manipulation requires additional training and carries a slightly higher risk (rare but serious complications in cervical manipulation: vertebrobasilar stroke). PT must rule out contraindications before cervical manipulation.

ORTHOPEDIC REHABILITATION

61. Ultrasound phonophoresis uses therapeutic ultrasound to deliver:

A. Electrical current to stimulate muscles

B. Topical medications (e.g., hydrocortisone, diclofenac) through the skin and into the tissue

C. Sound waves to break up kidney stones

D. Heat to dissolve adhesions

✓ Answer: B

💡 **Rationale & Explanation:**

Phonophoresis: uses ultrasound energy to DRIVE TOPICAL MEDICATIONS through the skin and into the target tissue (increases percutaneous absorption). The mechanical energy of the US loosens the skin's lipid barrier and increases cell membrane permeability, allowing the drug molecules to penetrate. Common drugs: hydrocortisone (anti-inflammatory), dexamethasone, diclofenac, lidocaine. Compare with IONTOPHORESIS (uses DC current to drive ionic drugs into the tissue). Both are non-invasive local drug delivery methods. Phonophoresis is used when iontophoresis is not suitable (e.g., for non-ionizable drugs) or as an alternative. Best evidence: for tendinopathy and soft tissue inflammation.

ORTHOPEDIC ASSESSMENT

62. The Hawkins-Kennedy test for shoulder impingement is performed by:

A. Passively forward flexing the arm with forearm pronated

B. Flexing the shoulder to 90°, then forcibly internally rotating the arm

C. Abducting the arm to 90° and externally rotating

D. Extending the arm behind the body

✓ Answer: B

💡 Rationale & Explanation:

Hawkins-Kennedy test: the examiner forward-flexes the shoulder to 90°, flexes the elbow to 90°, then forcibly INTERNALLY ROTATES the arm. This drives the supraspinatus (or biceps tendon) against the anterior surface of the coracoacromial ligament. POSITIVE = pain in the anterior or lateral shoulder. Sensitivity ~79%, specificity ~59%. Compare with Neer's test (arm forward flexed with forearm pronated, elbow extended). Together, Hawkins-Kennedy and Neer's test are the most commonly used impingement tests. A positive on BOTH tests significantly increases the probability of impingement or rotator cuff pathology.

├— ORTHOPEDIC REHABILITATION

63. The 'functional movement screen' (FMS) is used to:

A. Diagnose specific orthopedic injuries

B. Screen for movement pattern deficiencies and asymmetries that may predispose athletes to injury

C. Measure strength in specific muscle groups

D. Assess cardiovascular fitness

✓ Answer: B

💡 Rationale & Explanation:

The Functional Movement Screen (FMS) — developed by Cook and Burton — is a screening tool (NOT a diagnostic tool) that uses 7 fundamental movement patterns (deep squat, hurdle step, in-line lunge, shoulder mobility, active straight leg raise, trunk stability push-

up, rotary stability) to identify movement limitations and asymmetries. Each movement is scored 0-3. Total score /21. A score ≤14 is associated with higher injury risk. ASYMMETRY (different scores side to side) may be more predictive of injury than absolute score. PT uses FMS to guide corrective exercise priorities — address the lowest-scoring movements first. Not a replacement for individual joint assessment.

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64. The recommended weight-bearing status after a hip arthroplasty with a CEMENTLESS (press-fit) fixation is typically:

A. Non-weight-bearing for 3 months

B. Toe-touch weight-bearing only for 6 weeks

C. Weight-bearing as tolerated (WBAT) from post-operative day 1

D. Full weight-bearing only after 3 months when bone ingrowth is complete

✓ Answer: C

💡 Rationale & Explanation:

CEMENTLESS hip arthroplasty (press-fit fixation): the implant relies on bone INGROWTH into the porous coating for long-term fixation. Despite this, current evidence strongly supports WEIGHT-BEARING AS TOLERATED (WBAT) from day 1, as controlled loading actually PROMOTES bone ingrowth (Wolf's Law — bone adapts to mechanical loading). CEMENTED fixation also allows WBAT immediately. The old 'non-weight-bearing for 6 weeks' is outdated for primary total hip replacements. Exceptions: revisions, fractures, or complex situations where the surgeon specifies restrictions. The trend in modern fast-track arthroplasty protocols is immediate WBAT + early mobilization for better outcomes.

ORTHOPEDIC ASSESSMENT

65. Which of the following is NOT a component of the SPECIAL TESTS cluster for lumbar spinal stenosis?

A. Wide-based gait

B. Thigh pain worsened by walking and relieved by sitting or lumbar flexion

C. Positive SLR (Lasègue's test)

D. Bilateral neurogenic claudication

✓ Answer: C

💡 Rationale & Explanation:

Lumbar spinal stenosis (LSS) clinical pattern: neurogenic claudication (bilateral leg pain/fatigue/heaviness with walking, relieved by sitting, lumbar flexion, or bending over a shopping cart — 'shopping cart sign'); wide-based gait; symptoms worse with extension (extension narrows the spinal canal); symptoms relieved by flexion (widens the canal). The SLR (straight leg raise) is typically NEGATIVE in stenosis (it's positive in disc herniation compressing a single nerve root). The Positive SLR indicates nerve root tension — not stenosis. This distinction is critical: herniation = often positive SLR + unilateral radiculopathy; Stenosis = usually negative SLR + bilateral neurogenic claudication + older patient.

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66. Finkelstein's test is used to diagnose:

A. Lateral epicondylitis

B. De Quervain's tenosynovitis

C. Trigger finger

D. Dupuytren's contracture

✓ Answer: B

💡 Rationale & Explanation:

Finkelstein's test: patient flexes the thumb across the palm, then the examiner PASSIVELY ULNAR DEVIATES the wrist. POSITIVE = sharp pain over the first dorsal compartment at the radial styloid. Mechanism: the APL and EPB tendons (first dorsal compartment) are maximally stretched and compressed. Sensitivity ~89%, specificity ~84% — one of the most accurate special tests in the hand/wrist. De Quervain's tenosynovitis is one of the most common causes of radial-sided wrist

pain, especially in new mothers (repetitive lifting of babies). Treatment: thumb spica splint, corticosteroid injection, ice, activity modification, and eccentric exercises.

ORTHOPEDIC REHABILITATION

67. During the INITIAL phase of ACL reconstruction rehabilitation (weeks 1-2), the HIGHEST priority goal is:

A. Return to jogging

B. Achievement of full passive knee EXTENSION (0°)

C. 130° of knee flexion

D. Return to sport-specific drills

✓ Answer: B

💡 Rationale & Explanation:

ACL reconstruction early protocol (weeks 1-2): the MOST CRITICAL early goal is FULL PASSIVE KNEE EXTENSION (0°). Why? Because: 1) Flexion contractures are far harder to correct later than flexion deficits; 2) Loss of extension causes 'stiff-knee gait' (inability to weight-bear normally, altered mechanics, patellofemoral problems); 3) You can more easily regain flexion later than extension. Exercise to achieve and maintain extension: prone hangs, supine heel prop positioning (let gravity extend the knee). Swelling is the enemy — it causes arthrogenic muscle inhibition (the quad can't fully fire). Early quad sets, SLR, and extension exercises despite swelling. Full extension = TOP priority.

ORTHOPEDIC ASSESSMENT

68. The 'Dial test' at 30° and 90° knee flexion assesses:

A. MCL integrity

B. Posterolateral corner (PLC) and PCL integrity

C. ACL and anterior capsule integrity

D. IT band tightness

✓ **Answer: B**

💡 **Rationale & Explanation:**

Dial test: patient prone, examiner holds both ankles and externally rotates both lower legs simultaneously, comparing the side-to-side 'dial' rotation difference. Test at 30° AND 90° flexion: External rotation >10° MORE on the injured side at 30° but NOT at 90° → isolated POSTEROLATERAL CORNER (PLC) injury. External rotation >10° MORE at BOTH 30° AND 90° → PLC + PCL injury. The PCL limits tibial external rotation at 90°; without it, the external rotation increase persists. The PLC is a commonly missed injury — always test it when the PCL is suspected. Dial test combines with posterior drawer test (for PCL) and varus stress test (for LCL) for complete posterolateral assessment.

ORTHOPEDIC REHABILITATION

69. The rehabilitation principle of 'progressive overload' in tendinopathy management means:

A. Applying maximum tension to the tendon immediately

B. Systematically increasing the load on the tendon over time to stimulate collagen remodeling and improve load tolerance

C. Gradually reducing exercise intensity over the rehab period

D. Alternating complete rest with short exercise bursts

✓ **Answer: B**

💡 **Rationale & Explanation:**

In tendinopathy management, the tendon needs to be progressively LOADED to stimulate tenocyte activity, collagen synthesis, and tendon remodeling. The progression: Isometric exercises (first) → Isotonic (concentric + eccentric, low load) → Eccentric-only loading (Alfredson protocol for Achilles) → Heavy slow resistance → Plyometrics → Sport-specific loading. Each stage is advanced when the previous stage

produces no significant pain (VAS ≤3/10 during exercise, returning to ≤2/10 within 24 hours). Underloading = no adaptation. Overloading = injury flare. The 'sweet spot' of optimal tendon loading is what rehab aims to find and progressively increase.

ORTHOPEDIC ASSESSMENT

70. The shoulder 'Cross-body adduction test' (Horizontal adduction test) is used to assess:

A. Supraspinatus tear

B. Acromioclavicular (AC) joint pathology

C. Glenohumeral instability

D. Biceps tendon integrity

✓ Answer: B

💡 Rationale & Explanation:

Cross-body adduction test (also called horizontal adduction or scarf test): the examiner passively adducts the arm across the body horizontally while the elbow is flexed at 90°. POSITIVE = pain localized to the ACROMIOCLAVICULAR JOINT. The test compresses the AC joint by bringing the acromion and clavicle together. Sensitivity ~77%, specificity ~79% for AC joint pathology. Used after AC joint sprains, separations, or chronic OA of the AC joint. Don't confuse with the Posterior capsule stretch (same motion but done as a therapeutic stretch to improve internal rotation). O'Brien's test also includes cross-body adduction but tests both the SLAP lesion and the AC joint.

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71. The Thessaly test for meniscal injury is performed with the patient:

A. Supine, knee flexed to 90°, applying valgus stress

B. Standing on one leg, knee flexed to 20° and 5°, rotating the body internally and externally

C. Prone, knee flexed, applying compression to the posterior knee

D. Seated, swinging the leg in rotation

✓ **Answer: B**

💡 **Rationale & Explanation:**

Thessaly test: the patient stands on ONE LEG with the knee at 20° flexion (can also be done at 5°). The patient rotates their body internally and externally three times while maintaining this position. POSITIVE = joint line pain or catching/locking sensation. Mechanism: this simulates the torque forces on the meniscus during dynamic activity — reproducing the compressive-rotational loads that pinch a torn meniscus. The Thessaly test at 20° has sensitivity ~94% and specificity ~96% for meniscal tears — HIGHER than the McMurray test. It's a functional, dynamic test that better reflects real-world meniscal loading compared to the supine McMurray.

├— ORTHOPEDIC REHABILITATION

72. 'Neural tension' (neurodynamic) testing for the upper limb includes the ULTT (Upper Limb Tension Test). ULTT 1 (median nerve bias) is performed with:

A. Shoulder depression + abduction + external rotation + elbow extension + wrist/finger extension + cervical lateral flexion away

B. Shoulder depression + abduction + internal rotation + elbow flexion + wrist flexion

C. Shoulder elevation + elbow extension + wrist flexion

D. Prone shoulder horizontal abduction + elbow extension

✓ **Answer: A**

💡 **Rationale & Explanation:**

Upper Limb Tension Test 1 (ULTT1 — Median Nerve Bias): Patient supine. 1) Shoulder GIRDLE DEPRESSION (examiner depresses the shoulder); 2) Shoulder ABDUCTION (~110°); 3) Shoulder EXTERNAL ROTATION + wrist/finger EXTENSION; 4) Elbow EXTENSION. Sensitizing maneuver: cervical LATERAL FLEXION AWAY from the tested side. POSITIVE = reproduction of neural symptoms (not just stretch) that

change with sensitizing maneuvers. ULTT2a = radial nerve; ULTT2b = median nerve (different bias); ULTT3 = ulnar nerve bias (elbow flexion + wrist extension). The neurodynamic tests are the upper limb equivalent of the lower limb SLR and slump tests.

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73. In gait training post-hip arthroplasty, the MOST important gait deviation to address immediately is:

A. Reduced stride length

B. Trendelenburg gait (lateral trunk lean toward the operated side)

C. Mild toe-out positioning

D. Reduced cadence

✓ Answer: B

💡 Rationale & Explanation:

Trendelenburg gait after THA: the patient leans their TRUNK TOWARD THE OPERATED SIDE during single-leg stance — a compensatory strategy to reduce the demand on the weak GLUTEUS MEDIUS. While this compensation reduces hip abductor muscle force requirement, it is not normal and should be corrected. The Trendelenburg gait indicates gluteus medius weakness — a major target of THA rehabilitation. Gluteus medius strengthening (sidelying abduction, standing hip abduction, standing hip hikes, lateral band walks) is essential for restoring normal gait mechanics, reducing lateral pelvic drop, and protecting the new implant from excessive forces. This is one of the key functional goals for post-THA PT.

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74. The term 'kinesiophobia' refers to:

A. Fear of movement or physical activity due to anticipated pain or re-injury

B. Phobia of specific sports or exercises

C. Inability to coordinate movements due to neurological dysfunction

D. Avoidance of exercise due to lack of motivation

✓ Answer: A

💡 Rationale & Explanation:

Kinesiophobia: an excessive, irrational, and debilitating fear of physical movement and activity resulting from a feeling of VULNERABILITY to PAINFUL injury or re-injury. Measured by the Tampa Scale of Kinesiophobia (TSK) — score >37/68 indicates significant kinesiophobia. It's a major psychological barrier to rehabilitation and return to activity, especially after: musculoskeletal injuries, chronic pain conditions, post-surgical recovery, and fall-related injuries. Treatment: pain neuroscience education (PNE), graded exposure therapy (systematic exposure to feared movements), cognitive behavioral therapy (CBT), and validation of the patient's experience. Addressing kinesiophobia is essential for successful rehabilitation outcomes.

ORTHOPEDIC ASSESSMENT

75. What does a positive 'drop arm test' indicate?

A. ACJ separation

B. Large (full-thickness) supraspinatus or rotator cuff tear

C. Biceps tendon rupture

D. Deltoid paralysis from axillary nerve injury

✓ Answer: B

💡 Rationale & Explanation:

Drop arm test: the examiner passively abducts the patient's arm to 90°, then asks the patient to SLOWLY LOWER it to the side. POSITIVE = the arm DROPS SUDDENLY or the patient cannot control the descent (arm falls) — or the arm cannot be maintained at 90°. Indicates a LARGE (full-thickness) rotator cuff tear — typically the supraspinatus (which eccentrically controls shoulder adduction). A modified version: if the patient can hold the arm at 90° but cannot resist gentle pressure, it indicates a partial tear. Sensitivity ~27%, specificity ~88% — quite SPECIFIC but not sensitive (many full tears don't drop). High specificity = if positive, almost certainly a significant tear. Confirm with MRI.

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76. The Patellar tap test (ballottement test) assesses for:

A. Patellar tracking dysfunction

B. Intra-articular knee effusion (joint fluid)

C. Patellar tendon integrity

D. Patellofemoral instability

✓ Answer: B

💡 **Rationale & Explanation:**

Patellar tap/ballottement test: with the knee extended and relaxed, the examiner uses one hand to milk fluid from the suprapatellar pouch into the joint, then TAPS the patella sharply downward. POSITIVE = the patella bounces back (ballottement) as it compresses the fluid beneath it, then floats back up. This indicates significant intra-articular EFFUSION (joint fluid >30-50 mL). For smaller effusions (<50 mL): the BULGE SIGN (brush test) is more sensitive — stroking the medial groove upward, then stroking the lateral side, causes a visible fluid bulge to appear on the medial side. Large effusions also inhibit quadriceps function via arthrogenic inhibition — treat effusion to restore quad function.

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77. Which clinical test is used to assess the integrity of the collateral ligaments of the PIP joint of the finger?

A. Phalen's test

B. Lateral stress test of the PIP joint (valgus and varus stress)

C. Finkelstein's test

D. Allen's test

✓ Answer: B

💡 **Rationale & Explanation:**

PIP joint collateral ligament integrity: apply LATERAL STRESS (valgus or varus) to the PIP joint while the finger is held in 20-30° flexion (to unlock the collateral ligaments from their taut position in extension). Compare the DEGREE OF LAXITY (opening) with the contralateral finger. POSITIVE = more than 20° of deviation or a soft/absent end-feel, indicating collateral ligament rupture. 'Jammed finger' injuries

(common in ball sports) often injure the PIP collateral ligaments. Grade I: stable with pain. Grade II: partial tear, tender, mild laxity. Grade III: complete tear, significant laxity, may need buddy taping or surgical repair. These are small, easily missed injuries that lead to chronic instability if untreated.

ORTHOPEDIC REHABILITATION

78. The 'FABER' hip range of motion measurement is commonly used to assess hip external rotation and abduction in supine. A positive FABER distance test (side-to-side difference >4 cm) indicates:

A. Hip flexor tightness

B. Hip joint or SIJ restriction on the affected side

C. Gluteus medius weakness

D. Psoas impingement

✓ Answer: B

💡 Rationale & Explanation:

FABER distance test (quantitative version): patient supine, test leg in FABER position (hip flexion, abduction, external rotation — ankle on the opposite knee). Measure the distance from the LATERAL KNEE to the TABLE. Normal: the knee should nearly touch or be close to the table. Positive (side-to-side difference >4 cm OR absolute measurement >10-20 cm from the table): suggests HIP JOINT RESTRICTION (capsular pattern, labral tear, OA, hip impingement) or SIJ restriction on the tested side. This quantitative assessment adds objectivity to the standard FABER test. Track this measurement over rehabilitation to document progress. Limited FABER = one of the earliest signs of hip OA.

MANUAL THERAPY

79. 'Passive physiological intervertebral mobility testing' (PPIVM) assesses:

A. Muscle strength at each segmental level

B. The passive range of motion at INDIVIDUAL spinal segments by feeling for motion between adjacent vertebrae

C. Nerve root tension at each level

D. Disc height at each segmental level

✓ Answer: B

💡 **Rationale & Explanation:**

PPIVM (Passive Physiological Intervertebral Mobility Testing): the examiner passively moves the spine through a physiological motion (e.g., lumbar flexion-extension, rotation, lateral flexion) while PALPATING the interspinous spaces between adjacent vertebrae with the other hand, feeling for the relative motion between segments. HYPOMOBILE = less motion than expected (feels 'stuck'); HYPERMOBILE = excessive motion (feels too loose); NORMAL = symmetrical, smooth, spring-like motion. This is a cornerstone of manual therapy assessment — identifying hypomobile segments for mobilization and hypermobile segments for stabilization. Inter-rater reliability is moderate — clinical experience is essential for consistent findings.

ORTHOPEDIC ASSESSMENT

80. The 'external rotation lag sign' for the shoulder is used to assess:

A. Subscapularis tear

B. Supraspinatus tear

C. Infraspinatus and teres minor tear

D. Long head of biceps tear

✓ Answer: C

💡 **Rationale & Explanation:**

External Rotation Lag Sign: the examiner passively positions the shoulder in 20° abduction, elbow at 90° flexion, and passively externally rotates to near maximum. Then the examiner releases the wrist (still supporting the elbow). POSITIVE = the arm 'falls' (lags) back into internal rotation — the patient CANNOT MAINTAIN the externally rotated position. Indicates a tear of the INFRASPINATUS and/or TERES MINOR. Sensitivity ~98%, specificity ~98% for large infraspinatus tears. Compare: LIFT-OFF TEST (Gerber) assesses the SUBSCAPULARIS (internal rotation against resistance behind the back). BELLY PRESS TEST also assesses subscapularis. DROP ARM TEST assesses supraspinatus. Match the test to the specific cuff muscle you're testing!

ORTHOPEDIC REHABILITATION

81. In the management of shoulder instability, which exercise targets the 'force couple' that maintains dynamic glenohumeral stability?

A. Shoulder press overhead

B. Rotator cuff strengthening (IR + ER balance) combined with scapular stabilization exercises

C. Pectoralis major strengthening only

D. Deltoid isolation exercises in all planes

✓ Answer: B

💡 **Rationale & Explanation:**

Dynamic glenohumeral stability requires the ROTATOR CUFF to compress the humeral head into the glenoid ('concavity-compression' mechanism) while the deltoid abducts the arm. The four rotator cuff muscles create a compressive force couple — especially the balance between INTERNAL ROTATORS (subscapularis) and EXTERNAL ROTATORS (infraspinatus, teres minor). For shoulder instability: prioritize IR:ER balance (ER is often the weaker side), SCAPULAR STABILIZATION (provides the stable base for cuff function), and proprioception training (joint position sense). Avoid exercises that

place the shoulder in the APPREHENSION POSITION (90° abduction + ER) until sufficient strength and neuromuscular control are established.

ORTHOPEDIC ASSESSMENT

82. The Jerk test for posterior shoulder instability is positive when:

A. The humeral head subluxes anteriorly during the test

B. The humeral head subluxes posteriorly with a 'jerk' as the arm is adducted across the body in 90° of forward flexion with IR

C. The arm falls during eccentric testing

D. Pain is reproduced with horizontal adduction at 90° elevation

✓ Answer: B

💡 **Rationale & Explanation:**

Jerk test (posterior labral/capsule assessment): patient's arm at 90° forward flexion and INTERNAL ROTATION. Examiner applies axial load (compressive force along the humerus) and HORIZONTALLY ADDUCTS the arm across the body. POSITIVE = the humeral head SUBLUXES POSTERIORLY with a 'jerk' or clunk. Sometimes it reduces with a second jerk when the arm is moved back. Indicates POSTERIOR SHOULDER INSTABILITY — from posterior labral tear (Kim lesion), posterior capsular laxity, or posterior Bankart lesion. Common in: wrestlers, swimmers, offensive linemen. Contrast with anterior instability (apprehension test). Posterior instability requires a completely different rehabilitation approach than anterior instability.

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83. The 'long sitting test' in sacroiliac assessment evaluates:

A. Hamstring flexibility

B. The relative position of the medial malleoli when moving from supine to long sitting — to detect SIJ dysfunction

C. Lumbar range of motion

D. Hip flexor length

✓ Answer: B

💡 **Rationale & Explanation:**

Long sitting test (Supine-to-sit test): In SUPINE, measure the relative position of the medial malleoli (left vs right). Then ask the patient to SIT UP (long sitting position). Recheck the malleoli positions. Normal: malleoli remain symmetrical OR minimal change. Positive: if the short leg in supine becomes the LONG leg in sitting (or vice versa), this indicates SACROILIAC DYSFUNCTION (the ilium rotates relative to the sacrum with the change in position). However, this test has POOR RELIABILITY and should be used as part of a cluster, not in isolation. Better SIJ tests: provocation tests (distraction, compression, thigh thrust, FABER, Gaenslen's). The long sitting test is still frequently taught and tested in Philippines PT board examinations.

ORTHOPEDIC REHABILITATION

84. In total knee arthroplasty (TKA) rehabilitation, the 'stair climbing test' is used to assess:

A. Balance and vestibular function

B. Lower extremity functional strength and power, particularly quadriceps capacity in a weight-bearing task

C. Cardiovascular endurance

D. Hip flexor flexibility

✓ Answer: B

💡 **Rationale & Explanation:**

The stair climbing test in post-TKA rehabilitation: time the patient climbing and descending a flight of stairs (typically 12-step flight). Clinically meaningful improvement in stair climbing time correlates with: quadriceps strength recovery (eccentric control on descent, concentric power on ascent), proprioception and coordination, single-limb balance, and confidence. The stair descent requires ECCENTRIC QUADRICEPS control — this is why it's harder for many TKA patients than ascent. Goal: achieve safe, independent stair negotiation before

discharge. Normal adults: stair ascent ~0.5-0.6 steps/second. The step test (stepping up and down a single step repeatedly for 30-60 seconds) is a functional surrogate for LE power in older adults.

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85. For a patient with hip labral tear, which activity should be MODIFIED or avoided initially?

A. Swimming (flutter kick)

B. End-range hip flexion, especially combined with rotation and adduction (impingement positions)

C. Gentle hip abduction exercises

D. Non-weight-bearing gentle isometrics

✓ Answer: B

💡 **Rationale & Explanation:**

Hip labral tears are commonly caused or aggravated by FEMOROACETABULAR IMPINGEMENT (FAI) — where the femoral head or neck impinges against the acetabular rim in END-RANGE POSITIONS. The classic impingement positions to AVOID: hip flexion >90° + internal rotation + adduction (the 'FADIR' test position). Avoid: deep squats, hip flexion past 90° in sitting, crossing the legs, pivoting on the affected limb, and activities requiring extremes of combined motions. PT management: activity modification, posterior capsule and hip flexor stretching (which contribute to impingement), gluteus medius and deep hip rotator strengthening, core stability, and gait retraining. Post-surgical: labral repair requires specific precautions from the surgeon.

├— ORTHOPEDIC ASSESSMENT

86. The 'Anterior Impingement Test' (FADIR test) for the hip is performed with:

A. Hip extension + external rotation + abduction

B. Hip flexion to 90° + ADDUCTION + INTERNAL ROTATION (the FADIR position)

C. Standing hip flexion against resistance

D. Passive hip abduction in supine

✓ **Answer: B**

💡 **Rationale & Explanation:**

FADIR test (Flexion, ADduction, Internal Rotation): patient supine, examiner moves the hip into 90° FLEXION + ADDUCTION + INTERNAL ROTATION simultaneously. POSITIVE = pain in the anterior groin. This position brings the femoral neck into contact with the anterosuperior acetabular rim — reproducing FAI (femoroacetabular impingement) and labral pathology. Sensitivity ~96%, specificity ~25% — very SENSITIVE (rarely misses labral/FAI pathology) but NOT SPECIFIC (many patients with other conditions also test positive). Used as a SCREENING test — if NEGATIVE, labral tear or FAI is less likely. Positive FADIR = proceed to MRI arthrogram (gold standard for labral tear diagnosis). Common in young active adults and athletes.

├─ SPORTS REHABILITATION

87. The Copenhagen adductor exercise program is primarily used for:

A. Hip abductor strength and lateral stability

B. Prevention and rehabilitation of groin/adductor injuries in soccer players

C. Improving hip flexor flexibility

D. Strengthening the gluteus maximus

✓ **Answer: B**

💡 **Rationale & Explanation:**

Copenhagen adductor exercise: performed sidelying, the top foot is on a bench/partner's shoulder; the patient adducts the top leg to lift the hip off the ground (the bottom leg hangs free). This creates a significant eccentric adductor load. Evidence: the Copenhagen adduction program reduced groin injury incidence by ~41% in soccer players (Harøy et al., 2019 RCT). It specifically targets the adductor

longus — the most commonly strained groin muscle in kicking sports. The exercise is challenging — start with the knees bent (shorter lever arm) and progress to legs straight (longer lever arm). This specific exercise has moved from research novelty to standard practice in football/soccer PT worldwide, including in Philippine sports PT.

ORTHOPEDIC REHABILITATION

88. Instrument-Assisted Soft Tissue Mobilization (IASTM) is used to:

A. Fracture adhesions using high-force techniques

B. Apply controlled microtrauma to fibrotic soft tissue to stimulate a healing response and remodel collagen fibers

C. Perform joint manipulation of the spine

D. Deliver electrical stimulation to deep muscles

✓ Answer: B

💡 **Rationale & Explanation:**

IASTM (instrument-assisted soft tissue mobilization — includes Graston, ASTYM, HawkGrips): uses specialized metal or plastic instruments to detect and treat SOFT TISSUE RESTRICTIONS and fibrosis. Mechanism: the instruments apply controlled MICROTRAUMA to hypovascular, fibrotic tissue, stimulating a local inflammatory response → fibroblast recruitment → collagen remodeling. Clinically: used for chronic tendinopathy (lateral epicondylitis, Achilles, patellar), scar tissue management, chronic muscle tightness, and myofascial restrictions. Technique: the instrument is stroked at an angle over the tissue; 'gritty' feel or patient tenderness indicates restricted tissue. Evidence: moderate for pain reduction and function in tendinopathy. Combine with exercise for best outcomes.

ORTHOPEDIC ASSESSMENT

89. In a patient with lumbar spinal stenosis, the 'shopping cart sign' refers to:

A. Pain while shopping due to prolonged walking

B. Relief of symptoms when leaning forward on a shopping cart (lumbar flexion reduces stenosis and relieves neurogenic claudication)

C. Pain while pushing a cart due to increased lumbar extension

D. Inability to lift groceries due to lumbar weakness

✓ Answer: B

💡 **Rationale & Explanation:**

The 'shopping cart sign' (also called the 'stoop sign' or 'shopping cart gait'): patients with LUMBAR SPINAL STENOSIS report that they can walk farther and with less pain when leaning FORWARD (e.g., on a shopping cart, on a walker, walking up a hill, or cycling). This is because: LUMBAR FLEXION WIDENS the spinal canal and intervertebral foramina → less compression of the nerves → less neurogenic claudication. Extension narrows the canal and worsens symptoms. This is the opposite of a disc herniation patient (who usually prefers extension). Clinical use: if a patient says 'I can walk farther pushing my cart than walking without it,' suspect stenosis.

├— MANUAL THERAPY

90. Dry needling is used in PT practice to treat myofascial trigger points. It differs from acupuncture in that:

A. Dry needling uses thicker needles

B. Dry needling is based on neuroanatomy and myofascial trigger point theory, not traditional Chinese meridian theory; targets specific hyperirritable muscle bands

C. Acupuncture is more evidence-based than dry needling

D. Dry needling inserts needles into acupuncture points only

✓ Answer: B

💡 **Rationale & Explanation:**

Dry needling (Western Acupuncture/Intramuscular Stimulation): inserts a fine filiform needle into a MYOFASCIAL TRIGGER POINT (hyperirritable spot in a taut band of muscle). Based on WESTERN NEUROANATOMY, myofascial pain theory, and evidence from Travell and Simons' trigger point research. Acupuncture: based on Traditional Chinese Medicine meridian theory; needles inserted at 'qi channels' (acupuncture points). Key differences: different theoretical basis, different point selection criteria, different training standards. In the Philippines, dry needling by PTs is practiced in many settings but remains a topic of scope-of-practice discussion — currently, PTs who perform dry needling should have specific dry needling training and follow PRC/PAPT guidelines.

ORTHOPEDIC REHABILITATION

91. A patient with a popliteal (Baker's) cyst is referred to PT. What is the MOST appropriate initial PT management?

A. Direct aspiration of the cyst by the PT

B. Address the underlying cause (usually knee joint pathology — OA, meniscal tear, arthritis) and avoid activities that increase intra-articular pressure

C. Aggressive massage directly over the cyst

D. Immobilization in a cast until the cyst resolves

✓ **Answer: B**

💡 **Rationale & Explanation:**

Baker's cyst (popliteal cyst): a fluid-filled cyst behind the knee, usually arising from distention of the gastrocnemius-semimembranosus bursa due to EXCESS INTRA-ARTICULAR FLUID (from knee OA, meniscal tear, rheumatoid arthritis, or other joint pathology). PT management: 1) TREAT THE UNDERLYING CAUSE — reduce knee inflammation and effusion (which drives the cyst formation); 2) Appropriate exercise

(strengthening without overloading the irritated joint); 3) Ice for inflammation; 4) Activity modification. Direct aspiration (draining the cyst) is a physician procedure. The cyst usually resolves when the knee joint pathology is treated. A ruptured Baker's cyst can mimic DVT (sudden calf pain + swelling) — differential diagnosis with Homan's sign and ultrasound.

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92. Whiplash-associated disorders (WAD) are classified by the Quebec Task Force. WAD Grade III includes:

A. No complaint about the neck, no physical sign(s)

B. Neck complaint only with no physical signs

C. Neck complaint with MUSCULOSKELETAL SIGNS (decreased ROM, point tenderness)

D. Neck complaint with NEUROLOGICAL SIGNS (decreased or absent deep tendon reflexes, weakness, sensory deficits)

✓ Answer: D

💡 **Rationale & Explanation:**

Quebec Task Force WAD Classification: Grade 0 = No neck complaint, no physical signs; Grade I = Neck complaint only (pain, stiffness, tenderness) — no physical signs; Grade II = Neck complaint + MUSCULOSKELETAL SIGNS (decreased ROM, point tenderness); Grade III = Neck complaint + NEUROLOGICAL SIGNS (decreased/absent DTRs, weakness, sensory deficits = nerve root injury); Grade IV = Neck complaint + FRACTURE or DISLOCATION (X-ray positive). PT approach varies by grade: Grade I-II = active treatment (education, early mobilization, exercise); Grade III = address neurological deficits, pain management, neural mobilization; Grade IV = medical management first, PT after surgical stabilization. Prognosis worsens with increasing grade.

ORTHOPEDIC ASSESSMENT

93. During shoulder assessment, the O'Brien's active compression test is MOST useful for detecting:

A. Supraspinatus tear

B. Acromioclavicular joint pathology AND superior labral (SLAP) tears

C. Biceps tendon rupture

D. Subscapularis integrity

✓ Answer: B

💡 **Rationale & Explanation:**

O'Brien's test (Active Compression Test): arm at 90° forward flexion, 10° horizontal adduction, THUMB DOWN (full internal rotation). Examiner applies downward pressure while patient resists. Then repeat with THUMB UP (supination). POSITIVE: Pain in the thumb-down position that DECREASES or DISAPPEARS in the thumb-up position = SLAP tear (deep pain inside the joint). Pain on TOP of the shoulder in thumb-down position, relieved with thumb-up = AC JOINT pathology. The two different pain locations are KEY: inside = SLAP; on top = AC joint. Sensitivity for SLAP: ~63-80%, Specificity ~70-99%. One test, two diagnoses depending on WHERE the pain is.

├— ORTHOPEDIC REHABILITATION

94. The 'Fear-Avoidance Model' of chronic musculoskeletal pain proposes that:

A. Pain is directly proportional to tissue damage

B. Catastrophizing about pain leads to fear of movement, avoidance behavior, disuse, and perpetuation of pain — creating a vicious cycle

C. Strong pain medications break the fear-avoidance cycle

D. Patients with low pain tolerance need more aggressive treatment

✓ Answer: B

💡 **Rationale & Explanation:**

Fear-Avoidance Model (Vlaeyen & Linton): pain CATASTROPHIZING → pain is perceived as threatening → KINESIOPHOBIA (fear of movement) → AVOIDANCE of activities → DISUSE (deconditioning, muscle atrophy, reduced physical capacity) → DISABILITY → perpetuates pain (the cycle reinforces itself). Breaking the cycle: Pain Neuroscience Education (PNE) — explaining that pain ≠ damage; GRADED EXPOSURE THERAPY — systematically exposing patients to feared activities in a graduated way; Cognitive Behavioral Therapy (CBT). The Fear-Avoidance Model is now a cornerstone of chronic pain management. The Tampa Scale of Kinesiophobia (TSK) and Pain Catastrophizing Scale (PCS) measure these constructs. Addressing fear-avoidance is essential for successful rehabilitation of chronic pain.

ORTHOPEDIC ASSESSMENT

95. The 'painful arc' in shoulder assessment (pain between 60-120° of shoulder abduction) is characteristic of:

A. Frozen shoulder (adhesive capsulitis)

B. Subacromial impingement syndrome

C. AC joint pathology — pain at the top of the arc (>120°)

D. Glenohumeral OA

✓ Answer: B

💡 **Rationale & Explanation:**

Painful arc: pain that COMES AND GOES during shoulder abduction — specifically present between 60-120° but absent or less painful below 60° and above 120°. This is the CARDINAL SIGN of SUBACROMIAL IMPINGEMENT — in this range, the greater tuberosity and supraspinatus tendon pass directly under the acromion and coracoacromial ligament. Below 60° (the tuberosity is not yet under the arch) and above 120° (the tuberosity has cleared the arch) — pain is less. Compare: AC joint pain typically appears at the TOP of the arc (>120°) when the arm reaches overhead and the AC joint is

compressed. Frozen shoulder: pain and limitation THROUGHOUT the entire range — no specific arc.

ORTHOPEDIC REHABILITATION

96. A patient is treated for non-specific low back pain with motor control exercise. The primary target of motor control exercise is:

A. Strengthening global movers like the erector spinae

B. Improving the timing and coordination of deep spinal stabilizers — transversus abdominis, multifidus, and diaphragm

C. Increasing lumbar flexibility through passive stretching

D. Improving cardiovascular endurance

✓ Answer: B

💡 **Rationale & Explanation:**

Motor control exercise (MCE) for low back pain: based on evidence that patients with chronic LBP have IMPAIRED ACTIVATION TIMING and COORDINATION of deep spinal stabilizers — particularly the TRANSVERSUS ABDOMINIS (TA), LUMBAR MULTIFIDUS (LM), and pelvic floor. In normal individuals, the TA and multifidus pre-activate (feedforward activation) BEFORE limb movements to anticipate and manage spinal loading. In LBP patients, this pre-activation is DELAYED or absent. MCE: begins with isolated activation of deep stabilizers (abdominal drawing-in maneuver for TA, co-contraction exercises for multifidus), then progresses to functional movements with maintained stabilization. Higher-level evidence supports MCE for chronic LBP.

ORTHOPEDIC ASSESSMENT

97. The PRWE (Patient-Rated Wrist Evaluation) and DASH are outcome measures used for the wrist and upper extremity. The DASH score range is:

A. 0-10 (higher = worse)

B. 0-100 (higher = more disability/worse function)

C. 0-56 (higher = better function)

D. 0-48 (lower = more disability)

✓ Answer: B

💡 **Rationale & Explanation:**

DASH (Disabilities of the Arm, Shoulder and Hand): 30-item patient-reported outcome measure for upper extremity function. Score range: 0-100. Higher score = MORE DISABILITY. Minimum score (0) = no disability; maximum score (100) = extreme disability. There are two optional modules: work module (4 items) and sports/performing arts module (4 items). The QuickDASH is an 11-item short form. MCID for DASH: ~10-15 points. Other upper extremity PROMSs: PRWE (Patient-Rated Wrist Evaluation) = 15 items for wrist pain and function, 0-100 (100 = most disability); PSFS (Patient-Specific Functional Scale) = patient identifies 5 important activities and rates them 0-10 each.

├─ MANUAL THERAPY

98. 'Spinal manipulation' and 'spinal mobilization' differ in that:

A. Manipulation uses oscillatory techniques; mobilization uses thrust techniques

B. Manipulation is a HIGH VELOCITY LOW AMPLITUDE (HVLA) THRUST beyond the elastic barrier; mobilization is within the passive range using oscillatory or sustained techniques

C. Mobilization is more dangerous than manipulation

D. Manipulation is appropriate for any spinal condition; mobilization requires pathology

✓ Answer: B

💡 **Rationale & Explanation:**

Key distinction: MOBILIZATION (Maitland Grades I-IV): slow, controlled, OSCILLATORY or SUSTAINED movements WITHIN the physiological and elastic range — patient can stop it at any time. MANIPULATION (Grade V / HVLA): a single, FAST, SHORT-RANGE THRUST at or just beyond the elastic barrier — too fast for the patient to stop. Produces the 'pop.' Both are effective for neck and back pain. Manipulation has slightly faster pain relief in some studies but carries higher risk (rare but serious: carotid/vertebral artery dissection with cervical manipulation). In Philippine PT practice: spinal mobilization is well within PT scope; the specific legislation governing HVLA thrust manipulation by PTs continues to evolve. Screening for contraindications is mandatory before cervical manipulation.

ORTHOPEDIC ASSESSMENT

99. The 'Hip Scour' test (also called the Quadrant test) is used to:

A. Assess hip flexor strength specifically

B. Screen for intra-articular hip pathology by applying compressive and rotational force through the hip joint

C. Measure hip adductor flexibility

D. Test hip abductor strength against gravity

✓ Answer: B

💡 **Rationale & Explanation:**

Hip Scour/Quadrant Test: patient supine, hip in 90° flexion. Examiner applies an axial compressive load down the femur into the acetabulum, then moves the hip through a quadrant of motion — from maximum adduction/IR to maximum abduction/ER — while maintaining compression. POSITIVE = clicking, catching, pain, or restriction of motion. This tests for intra-articular pathology: labral tears, loose bodies, chondral defects, early OA. The compression + rotation is designed to 'feel' the articular surfaces and labrum for abnormality. Sensitivity is moderate (~60-75%). Always compare sides.

A positive hip scour + positive FADIR + groin pain in a young active patient = high suspicion for labral tear or FAI.

ORTHOPEDIC REHABILITATION

100. In a patient with a lateral ankle sprain, the MOST evidence-based early intervention to facilitate recovery is:

A. Complete immobilization in a cast for 3-4 weeks

B. PRICE (Protection, Rest, Ice, Compression, Elevation) for the first 48-72 hours followed by early PROTECTED WEIGHT-BEARING and ACTIVE MOBILIZATION

C. Surgical repair of the ATFL in all Grade II sprains

D. Prolonged crutch use for 4-6 weeks

✓ Answer: B

💡 **Rationale & Explanation:**

Current evidence for lateral ankle sprain: EARLY CONTROLLED MOBILIZATION is SUPERIOR to immobilization for Grade I-II sprains. Protocol: PRICE in the first 48-72 hours to control pain and swelling; then EARLY WEIGHT-BEARING (as pain allows — crutches only if needed for comfort, not routinely); ACTIVE ROM exercises (alphabet exercises with the foot, circumduction) within pain-free range; PROPRIOCEPTION TRAINING (single-leg balance) starting within days of injury; PROGRESSIVE STRENGTHENING (especially peroneals and calf muscles). Early mobilization restores ROM faster, reduces swelling more effectively, and allows earlier return to sport. Semi-rigid bracing (ankle brace) during return to sport reduces re-injury risk by ~70%.

ORTHOPEDIC ASSESSMENT

101. The 'Fulcrum test' for stress fractures of the femoral shaft involves:

A. Valgus stress to the knee

B. Placing the examiner's arm under the thigh as a fulcrum and applying gentle downward pressure to the knee — positive if sharp anterior thigh pain is reproduced

C. Compression of the femoral head into the acetabulum

D. Palpation of the inguinal ligament

✓ Answer: B

💡 **Rationale & Explanation:**

Fulcrum test for femoral shaft stress fractures: the patient sits at the edge of the table with legs hanging. The examiner places their forearm UNDER the thigh at various levels and gently pushes down on the KNEE. The examiner's arm acts as a LEVER/FULCRUM. POSITIVE = sharp, localized anterior thigh pain at the point where the examiner's arm contacts the bone — reproducing pain at the fracture site. Used in: runners, military recruits, dancers with anterior thigh pain. Stress fractures need MRI for definitive diagnosis (X-ray may be normal for weeks). Femoral shaft stress fractures are serious — complete fracture risk — activity modification until healed.

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102. The 'Kendall test' for rectus femoris tightness modifies the Thomas test by:

A. Adding hip abduction during the test

B. Holding the opposite hip in maximum flexion and assessing knee flexion of the test leg — limited knee flexion (<90°) or anterior pelvic tilt indicates rectus femoris tightness

C. Extending the hip past neutral

D. Using a prone position

✓ Answer: B

💡 **Rationale & Explanation:**

Thomas test modification for RECTUS FEMORIS: Standard Thomas test: lumbar spine flattened by holding one knee to chest (corrects for anterior pelvic tilt), then lower the other leg. Modified Kendall/Thomas (rectus femoris specific): if the KNEE FLEXES LESS THAN 90° as the hip extends to the table, or if the KNEE ANGLE

INCREASES (extends) when you try to further flex it passively, the rectus femoris is tight. The rectus femoris is biarticular — it crosses both hip and knee. Tight rectus femoris → limited knee flexion when the hip is extended (stretches the full length). This is different from iliopsoas tightness (which restricts hip extension regardless of knee position).

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103. Dial test at 30° ONLY positive (not at 90°) indicates:

A. Combined PCL and PLC injury

B. Isolated posterolateral corner (PLC) injury

C. Isolated ACL injury

D. Isolated MCL injury

✓ Answer: B

💡 **Rationale & Explanation:**

Dial test interpretation: at 30° ONLY positive (>10° more ER than contralateral) = ISOLATED POSTEROLATERAL CORNER (PLC) injury. The PCL controls tibial external rotation at 90° — if the PCL is intact, it limits the external rotation at 90° despite a PLC injury. At BOTH 30° AND 90° positive = PLC + PCL combined injury (PCL is also insufficient). This distinction is CRITICAL for surgical planning — an isolated PLC repair/reconstruction has different outcomes than a combined PCL+PLC reconstruction. The dial test should always be performed BILATERALLY for comparison. Difference >10° = positive. This level of detail about the dial test demonstrates advanced clinical reasoning.

├— MANUAL THERAPY

104. The 'Trigger point dry needling' clinical presentation that best responds to treatment is:

A. Chronic fibromyalgia with widespread pain

B. Focal myofascial pain with palpable taut bands, referred pain patterns, and local twitch response (LTR)

C. Acute fracture pain

D. Central sensitization pain without local tissue findings

✓ **Answer: B**

💡 **Rationale & Explanation:**

Optimal trigger point dry needling candidates: MYOFASCIAL PAIN with: palpable TAUT BANDS in the muscle; a TENDER SPOT within the taut band (the trigger point); characteristic REFERRED PAIN pattern on compression; elicitation of a LOCAL TWITCH RESPONSE (LTR — involuntary spinal reflex contraction of the taut band muscle fibers when the needle contacts the TrP). The LTR is both diagnostic (confirms needle placement) and therapeutic (mechanical disruption of the dysfunctional motor endplate activity). Dry needling is NOT indicated for diffuse fibromyalgia pain without local TrP findings — that requires central sensitization management. Always combine dry needling with manual therapy and corrective exercise for lasting results.

├— ORTHOPEDIC REHABILITATION

105. After a tibial plateau fracture, weight-bearing is typically restricted for 6-12 weeks. The PRIMARY reason is:

A. Pain management

B. Protecting the articular cartilage and bone from collapse while healing and bone consolidation occur

C. Reducing swelling

D. Preventing wound infection

✓ **Answer: B**

💡 **Rationale & Explanation:**

Tibial plateau fractures (Schatzker classification I-VI): the fracture involves the WEIGHT-BEARING SURFACE of the tibia (the articular cartilage of the tibial plateau). If weight is applied before adequate bone healing: 1) The fracture can COLLAPSE (depress further) → worse

articular incongruity; 2) CARTILAGE DAMAGE → accelerated OA. Typically: Non-weight-bearing for 6-8 weeks (complex fractures), then toe-touch weight-bearing (TTWB), then partial WB, then full WB as X-ray shows consolidation. CPM is often used immediately post-operatively to maintain cartilage nutrition and ROM while keeping the joint unloaded. Early ROM with protected weight-bearing is the gold standard approach.

SPORTS REHABILITATION

106. The Nordic hamstring curl exercise is specifically used for:

A. Quadriceps strengthening

B. Eccentric hamstring strengthening to prevent hamstring strains in athletes

C. Hip flexor flexibility

D. Calf strengthening

✓ Answer: B

💡 **Rationale & Explanation:**

Nordic hamstring curl (NHC): athlete kneels on padded knees, feet anchored by a partner or device, then slowly lowers their UPPER BODY toward the ground using ECCENTRIC hamstring contraction, catching with their hands. Eccentric phase: the hamstrings lengthen under load (extremely high eccentric hamstring force). Evidence: the NHC program reduces hamstring strain incidence by ~51% (Van der Horst et al., 2015). The NHC induces architectural changes in the biceps femoris (increased fascicle length = reduced strain injury risk at high velocities). However: NHC is DIFFICULT and induces significant DOMS initially — requires proper progressive introduction. Currently a standard component of injury prevention programs in football, sprinting, and team sports.

ORTHOPEDIC REHABILITATION

107. Rocktape vs. McConnell tape in shoulder taping: Rocktape (kinesiology tape) application for shoulder impingement is primarily intended to:

A. Rigidly fix the shoulder joint in a specific position

B. Provide proprioceptive feedback, facilitate scapular positioning, and reduce pain through skin lifting/decompression

C. Provide the same rigid support as athletic strapping tape

D. Replace scapular stabilization exercises

✓ Answer: B

💡 Rationale & Explanation:

Kinesiology tape (Rocktape, KT tape) for shoulder: Unlike rigid strapping tape, kinesiology tape is ELASTIC and moves with the skin. For shoulder impingement: applied to the LOWER TRAPEZIUS and SERRATUS ANTERIOR regions to: 1) Facilitate muscle activation (tape in direction of muscle action, 15-25% tension); 2) Improve SCAPULAR POSITIONING (posterior tilt, upward rotation) — reducing subacromial impingement; 3) PROPRIOCEPTIVE FEEDBACK — the elastic tension on the skin provides constant tactile cues about scapular position. Evidence: moderate for short-term pain relief and scapular kinematics. Best used as an ADJUNCT to exercise, not a standalone treatment. Tape should be re-applied every 3-5 days.

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108. Hip arthroplasty 'rapid recovery' or 'fast-track' protocols aim to:

A. Keep patients in hospital for 2+ weeks

B. Optimize preoperative preparation, use multimodal analgesia, and achieve same-day or next-day discharge with early PT ambulation

C. Avoid all PT contact in the first week

D. Use general anesthesia exclusively

✓ Answer: B

💡 Rationale & Explanation:

Fast-track/rapid recovery arthroplasty protocols: a multidisciplinary, evidence-based pathway that achieves BETTER OUTCOMES with SHORTER HOSPITAL STAY. Components: PREOPERATIVE: patient education, prehabilitation (strengthen muscles before surgery), optimization of comorbidities. INTRAOPERATIVE: minimally invasive technique, spinal anesthesia (not general), multimodal analgesia (reducing opioids). POSTOPERATIVE: same-day or next-day ambulation with PT, early oral nutrition, goal-directed physiotherapy, discharge within 1-3 days. Evidence: same-day discharge THA is safe for appropriately selected patients with equal outcomes to traditional 3-5 day stays. PT is CRUCIAL in fast-track: ambulation, education, safety assessment, early functional training.

ORTHOPEDIC ASSESSMENT

109. The 'step-off test' (posterior sag test) for the PCL is performed by:

A. Applying posterior force to the tibia at 90° of knee flexion

B. Observing the patient supine with knees at 90° flexion — a POSTERIOR SAG of the tibia on the femur (loss of the normal tibial step-off) indicates PCL insufficiency

C. Palpating the joint line with valgus stress

D. Rotating the tibia internally with compression

✓ Answer: B

💡 Rationale & Explanation:

Posterior Sag Sign (Godfrey test / step-off test): patient lies supine, hips and KNEES at 90°. Examiner observes the PROFILE of the knee. Normally: the tibial tuberosity is ANTERIOR to the femoral condyles (there is a 'step off'). POSITIVE: the tibia SAGS POSTERIORLY — the tibial tuberosity drops level with or behind the femoral condyles — the 'step off' disappears. This indicates PCL insufficiency — the tibia is no longer held anteriorly by the PCL. This is the MOST SPECIFIC test for PCL tear (~98% specificity). Passive posterior drawer test (pushing the tibia posteriorly at 90° flexion) is also used. PCL injuries often occur

from direct anterior force to the proximal tibia (dashboard injury in car accident).

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110. The Thessaly test is considered more accurate than the McMurray test because:

A. It is easier to perform

B. It is done weight-bearing — the axial loading and rotational forces better simulate the actual mechanism of meniscal injury during functional activities

C. It specifically tests only the medial meniscus

D. It does not require patient participation

✓ Answer: B

💡 **Rationale & Explanation:**

Thessaly test advantage: performed WEIGHT-BEARING (axial load + rotation = the actual in-vivo conditions that stress a meniscus during sport). The McMurray test is performed supine with NO axial loading — less physiologically relevant. Thessaly's combination of: body weight compression on the knee + twisting rotation = genuinely stresses the meniscus in the way sports activities do. The physiological loading in standing means the Thessaly test captures meniscal impingement that may not be apparent in the non-loaded McMurray test. Sensitivity ~94% at 20° vs. ~70% for McMurray. This is why modern evidence-based practice favors the Thessaly test for meniscal assessment, though both are still used clinically.

├— ORTHOPEDIC REHABILITATION

111. In the management of patellar tendinopathy ('jumper's knee'), the MOST evidence-based initial exercise intervention is:

A. Passive stretching of the quadriceps only

B. Isometric quadriceps contractions (e.g., leg press isometric hold) — proven to provide immediate pain relief and allow exercise without

flaring symptoms

C. Aggressive plyometrics from day one

D. Rest and ice only, no exercise

✓ Answer: B

💡 **Rationale & Explanation:**

Patellar tendinopathy management: The ISOMETRIC APPROACH has emerged as the best initial intervention. Isometric quadriceps contractions at 60-70% MVC, held for 45 seconds × 4 reps, performed 4x/day: provide IMMEDIATE PAIN RELIEF (via cortical inhibition of pain, lasting 30-45 minutes post-exercise); allow the tendon to be loaded without the high reactive stress of eccentric exercises; reduce cortical inhibition of the quadriceps. Following isometric phase: progress to HEAVY SLOW RESISTANCE (HSR) isotonic loading (both concentric and eccentric, 4 sets × 8-15 reps, 3 days/week) — highest evidence for long-term tendon remodeling. Alfredson eccentric-only protocol is more established for ACHILLES tendinopathy; HSR is preferred for patellar tendinopathy.

├— ORTHOPEDIC ASSESSMENT

112. The 'piano key sign' at the acromioclavicular joint indicates:

A. Supraspinatus tear

B. AC joint separation with superior displacement — the distal clavicle can be pressed down like a piano key and springs back up

C. Glenohumeral instability

D. Biceps tendon subluxation

✓ Answer: B

💡 **Rationale & Explanation:**

Piano key sign: in AC joint separation (specifically Grade III+), the DISTAL CLAVICLE is superiorly displaced. The examiner pushes the distal clavicle DOWN — it reduces (springs back down). When released, it SPRINGS BACK UP (like a piano key). This is pathognomonic

for AC joint separation with a disrupted acromioclavicular ligament and coracoclavicular ligament complex. AC separation grading: Grade I = sprain (no displacement); Grade II = partial AC ligament tear, minimal displacement; Grade III = complete AC and CC ligament disruption, significant clavicle displacement; Grade IV-VI = more severe displacement. Grades I-III usually managed conservatively (PT); Grade IV-VI often surgical.

├─ SPORTS REHABILITATION

113. The 'return to running' protocol after lower extremity injury requires the patient to first achieve:

A. 60% of normal quadriceps strength

B. Pain-free single-leg heel raises × 25, no limp at 6 km/h walking, and functional tests passed (hop tests LSI ≥90%)

C. Complete resolution of swelling

D. 3 months of complete rest

✓ Answer: B

💡 **Rationale & Explanation:**

Return to running criteria (evidence-based): before starting a running program after LE injury, the patient should demonstrate: PAIN-FREE at rest and during low-load activities; ADEQUATE STRENGTH: single-leg heel raises × 25 (calf), single-leg mini squat × 25 without pain/compensation; NORMAL GAIT at walking speed (no limp at 6 km/h); FUNCTIONAL TESTS: single-leg hop for distance, triple hop, crossover hop — LSI ≥90% compared to uninjured side. The actual return to running uses a GRADED PROTOCOL: walk/jog intervals → jog → continuous run → faster run → sport-specific. Criterion-based return (not time-based alone) reduces re-injury risk. Never return to running with persistent pain or significant limb asymmetry.

ORTHOPEDIC REHABILITATION

114. In managing a post-operative rotator cuff repair, the INITIAL phase focuses on:

A. Immediate full active range of motion to prevent stiffness

B. Passive range of motion and pendulum exercises — protecting the surgical repair while preventing adhesion formation

C. Heavy resistance exercises to prevent atrophy

D. Return to overhead sport within 3 months

✓ Answer: B

💡 **Rationale & Explanation:**

Post-rotator cuff repair phases: PHASE 1 (0-6 weeks): PASSIVE ROM only — the repaired tendon is vulnerable; active contraction against resistance risks re-tear. Pendulum exercises (gravity-assisted), passive ER/FF by the therapist. Sling at rest. Goal: protect repair, prevent joint stiffness. PHASE 2 (6-12 weeks): Active-assisted ROM, gentle active ROM. PHASE 3 (12-20 weeks): Active ROM, progressive isometric → isotonic strengthening. PHASE 4 (5-9+ months): Sport-specific, return to overhead activity. Timeline varies with repair size (small tear = faster, massive tear = slower). Critical: PREMATURE ACTIVE MOTION = RE-TEAR RISK. Patience in the early phase is essential.

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115. The Modified Oswestry Disability Index (ODI) is a patient-reported outcome measure for:

A. Shoulder disability

B. Lumbar spine low back pain disability — 10 items covering pain intensity and ADL limitations

C. Hip OA

D. Cervical radiculopathy

✓ Answer: B

💡 **Rationale & Explanation:**

Oswestry Disability Index (ODI): 10-item patient-reported questionnaire for LOW BACK PAIN disability. Items: pain intensity, personal care (washing/dressing), lifting, walking, sitting, standing, sleeping, sex life, social life, traveling. Each item scored 0-5, total 0-50, converted to percentage (0-100%). Interpretation: 0-20% = minimal disability; 21-40% = moderate; 41-60% = severe; 61-80% = crippling; 81-100% = bed-bound. MCID: ~10 points (10%). Widely used in lumbar spine research and clinical practice. Compare: NDI (Neck Disability Index) = cervical spine; DASH = upper extremity; KOOS = knee; HOOS = hip. Match the outcome measure to the region — PRC boards frequently test this matching.

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116. The 'articular cartilage' of synovial joints is maintained by:

A. Blood supply from the synovial membrane

B. Periodic loading and unloading (cyclic compression) which promotes nutrient delivery from the synovial fluid — cartilage is avascular

C. Daily corticosteroid injections

D. Direct nerve supply from the joint capsule

✓ Answer: B

💡 **Rationale & Explanation:**

Articular cartilage is AVASCULAR (no blood supply), ANEURAL (no nerves), and ALYMPHATIC — it receives nutrition from SYNOVIAL FLUID via DIFFUSION and cyclic COMPRESSION. When joint is loaded: fluid is squeezed out of cartilage, bringing waste products with it. When joint is unloaded: fluid flows back in, bringing nutrients and oxygen. This is the 'cartilage pump' mechanism. Implications: IMMOBILIZATION → cartilage atrophy (no nutrient cycling); CONTINUOUS PASSIVE MOTION (CPM) post-surgery → maintains cartilage nutrition without damaging joint loads; APPROPRIATE EXERCISE is essential for cartilage health — complete rest is detrimental. This is the biological basis for early motion and exercise in PT following joint injuries and surgeries.

ORTHOPEDIC ASSESSMENT

117. In shoulder assessment, a positive 'Belly press test' indicates:

A. Supraspinatus insufficiency

B. Subscapularis insufficiency — the patient cannot maintain the wrist against the abdomen without extending the wrist or elevating the elbow

C. Infraspinatus tear

D. Biceps subluxation

✓ Answer: B

💡 Rationale & Explanation:

Belly press test (Gerber): patient places the palm flat on their abdomen and is asked to press firmly while maintaining a neutral wrist and keeping the elbow in front of the body. POSITIVE: the patient CANNOT maintain this position — the wrist EXTENDS and the elbow DROPS BACK to generate pressure (substituting with the posterior deltoid instead of the subscapularis). Mechanism: pressing the hand against the belly requires INTERNAL ROTATION — the subscapularis primary function. If the subscapularis is torn, the patient cannot generate this force. Used for subscapularis tear assessment alongside the lift-off test and bear-hug test. Important because subscapularis tears are often missed and are the most common rotator cuff tear in anterior shoulder surgery.

ORTHOPEDIC REHABILITATION

118. The PSFS (Patient-Specific Functional Scale) differs from disease-specific outcome measures in that:

A. It uses standardized activities selected by the therapist

B. The PATIENT identifies their own 3-5 most important functional activities limited by their condition and rates them 0-10 — making it

individualized and personally meaningful

C. It only measures pain intensity

D. It uses a fixed 100-item questionnaire

✓ **Answer: B**

💡 **Rationale & Explanation:**

PSFS (Patient-Specific Functional Scale — Stratford et al.): 1) Patient identifies 3-5 ACTIVITIES they find most difficult due to their problem (completely personalized — their own goals); 2) Patient rates current ability on each activity 0-10 (0 = unable to perform, 10 = able to perform at pre-injury level). Advantages: captures WHAT MATTERS MOST to THIS patient (not a standardized list); sensitive to change; valid for any musculoskeletal condition; bridges the gap between impairment and patient-centred outcome. MCID: ~2 points per activity. Example: a teacher may rate 'writing on the board' (shoulder problem); a farmer may rate 'carrying feed bags.' The PSFS truly reflects the ICF participation level — what the patient VALUES in their life.

├— SPORTS REHABILITATION

119. The 'SEBT' (Star Excursion Balance Test) is used to assess:

A. Spinal mobility

B. Dynamic single-leg balance and lower extremity reach — predicts injury risk and assesses deficits after ankle/knee injury

C. Aerobic fitness

D. Upper extremity coordination

✓ **Answer: B**

💡 **Rationale & Explanation:**

Star Excursion Balance Test (SEBT): patient stands on one foot and reaches with the other foot in 8 directions (anterior, anteromedial, medial, posteromedial, posterior, posterolateral, lateral, anterolateral) as far as possible while maintaining single-leg balance. The

NORMALIZED reach distance (reach distance ÷ leg length × 100) is compared bilaterally. Asymmetry >4 cm in posteromedial reach = increased ankle sprain and lower extremity injury risk. The Y-Balance Test (YBT) is a simplified 3-direction version (anterior, posteromedial, posterolateral) — most commonly used in injury screening and return-to-sport testing. The SEBT/YBT is excellent for: post-ankle sprain assessment, knee injury screening, concussion return-to-sport testing, and sports pre-participation screening.

ORTHOPEDIC REHABILITATION

120. In managing a patient with lumbar spondylolisthesis (Grade I-II), which exercise approach is MOST appropriate initially?

A. Aggressive lumbar extension exercises

B. Spinal stabilization exercises — core and trunk muscle co-activation to control segmental movement and reduce shear forces at the unstable level

C. Passive lumbar flexion exercises

D. Heavy deadlifts and squats from day one

✓ Answer: B

💡 Rationale & Explanation:

Lumbar spondylolisthesis (vertebra slipping forward) management: the primary problem is SEGMENTAL INSTABILITY — the vertebra slides on the one below, often due to a defect in the pars interarticularis (isthmic) or facet arthritis (degenerative). PT approach: SPINAL STABILIZATION — training the DEEP SEGMENTAL STABILIZERS (transversus abdominis, multifidus, diaphragm, pelvic floor) to co-contract and control the slipping segment. Goal: 'stiffen' the unstable segment functionally. Avoid: exercises that INCREASE ANTERIOR SHEAR FORCE — especially lumbar EXTENSION EXERCISES (prone cobra, lumbar extension machine) as these can WORSEN the forward slip. Start with neutral spine stabilization, progress to functional movements maintaining neutral lumbar position.

ORTHOPEDIC ASSESSMENT

101. The 'Bounce home test' for meniscal injury is performed by:

A. Valgus stress to the knee

B. Passively flexing the knee fully, then quickly releasing it — a positive result is a RUBBERY STOP or PAIN at full extension (rather than a crisp, clean extension)

C. Palpating the joint line during extension

D. Axial compression with rotation

✓ Answer: B

💡 Rationale & Explanation:

Bounce home test (also called the 'extension lag' or 'end-range extension' test for meniscal injury): the patient lies supine; examiner fully flexes the knee passively, cups the heel, then quickly releases the knee to extend passively. In a NORMAL knee: the knee extends crisply and completely with a clean endpoint. POSITIVE: the knee does NOT fully extend — it stops with a rubbery, spring-like resistance (like a doorstop) or the patient experiences pain. This suggests a BUCKET-HANDLE MENISCAL TEAR that is mechanically blocking full extension (the torn fragment is acting as a 'block' in the joint). Sensitivity for locked meniscal tear is high (~80%). Often combined with McMurray test, Thessaly test, and joint line palpation.

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102. The 'passive knee extension test' (PKE or Hamstring length test) measures:

A. Quad strength

B. Hamstring flexibility — patient supine with hip at 90°, the examiner passively extends the knee; normal = extension to <20° from full extension; tightness = knee stops before neutral

C. Knee hyperextension

D. Popliteal angle

✓ **Answer: B**

💡 **Rationale & Explanation:**

Passive knee extension test for hamstring length: the patient is SUPINE with the hip stabilized at 90° flexion (thigh vertical). The examiner passively EXTENDS THE KNEE as far as possible. Normal hamstring length: knee reaches within 20° of full extension (popliteal angle 0-20°). TIGHT HAMSTRINGS: knee stops significantly before full extension (popliteal angle >20° = tight, >45° = very tight). Clinical significance: tight hamstrings contribute to: posterior pelvic tilt (reducing lumbar lordosis), knee flexion in gait (reduced push-off), anterior knee pain (via shortened moment arm), and compensatory lumbar flexion during activities. Also measured as the 'popliteal angle' — particularly important in pediatric CP patients where hamstring spasticity limits functional sitting and gait.

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103. The 'Hip FADIR test' is DIFFERENT from the 'hip scouring test' in that:

A. They are identical tests

B. FADIR is a SPECIFIC POSITION (Flexion, ADduction, Internal Rotation) used as a PROVOCATIVE TEST for impingement/labral pathology; the scouring test adds AXIAL COMPRESSION and CIRCUMDUCTION through a range of motion — assessing articular surface pathology with dynamic movement

C. FADIR tests the labrum only, scouring tests the capsule only

D. The scouring test is done weight-bearing

✓ **Answer: B**

💡 **Rationale & Explanation:**

Clinical distinction: FADIR TEST: examiner passively positions the hip in 90° flexion + adduction + internal rotation simultaneously. A STATIC provocative position. Tests for: femoroacetabular impingement (CAM or Pincer type), labral tear, anterior hip pathology. Sensitivity ~96% (good screen). HIP SCOURING/QUADRANT TEST: examiner applies AXIAL COMPRESSIVE LOAD through the femur into the acetabulum, then moves the hip through a quadrant (arc) of motion — FLEXION + ADDUCTION + IR → FLEXION + ABDUCTION + ER. DYNAMIC

assessment of articular surface: detects clicks, catches, or restriction indicating cartilage defects, loose bodies, or early OA. Together, these tests provide comprehensive intra-articular hip screening — both should be part of every thorough hip examination.

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104. Which test specifically assesses the POSTERIOR TIBIAL TENDON (PTT) during a functional weight-bearing task?

A. Thomas test

B. Single-heel rise test — the patient stands on one foot and rises onto the toes; failure to rise or excessive flatfoot pronation indicates PTT insufficiency

C. Ober test

D. Talar tilt test

✓ Answer: B

💡 **Rationale & Explanation:**

Single-heel rise test for PTT function: the patient stands on ONE foot and attempts to rise onto their toes. NORMAL: the heel inverts and the medial arch rises (the PTT actively supinates the subtalar joint during plantar flexion). PTT INSUFFICIENCY: the patient CANNOT rise onto the toes on the affected side, OR can rise but the heel does NOT invert (remains in valgus). With significant PTT dysfunction: the 'too many toes' sign is also visible from behind (more toes visible lateral to the heel on the affected side due to forefoot abduction and hindfoot valgus). This is the MOST FUNCTIONAL AND CLINICALLY RELEVANT test for PTT — more informative than palpation alone. Also used to monitor recovery after PTT repair or conservative management.

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105. The 'Apprehension-Relocation test' for anterior glenohumeral instability involves:

A. Testing ACJ stability

B. Placing the shoulder in the position of risk (90° abduction + ER) — patient apprehension with lateral force (apprehension test) and RELIEF of apprehension when examiner pushes the humeral head posteriorly (relocation test) — confirming anterior instability

C. Testing posterior capsule tightness

D. Assessing rotator cuff function

✓ **Answer: B**

💡 **Rationale & Explanation:**

Apprehension-Relocation test (Jobe): TWO-PART TEST for anterior glenohumeral instability. PART 1 (Apprehension): patient supine, shoulder at 90° abduction + maximum ER. POSITIVE = patient becomes apprehensive (grabs the examiner, says 'stop,' tenses) — fearing the shoulder will dislocate anteriorly. PART 2 (Relocation): WITH THE PATIENT IN THE APPREHENSION POSITION, examiner places a hand on the anterior shoulder and applies a POSTERIOR FORCE on the humeral head. POSITIVE = apprehension DISAPPEARS (shoulder feels safe again as the humeral head is pushed back into the glenoid). SPECIFICITY for anterior instability: 87-90%. This two-part approach confirms it's instability, not just impingement pain that causes the apprehension. The relocation test is the KEY distinguishing feature.

├— MANUAL THERAPY

106. 'Neural mobilization' (neurodynamics) works through which proposed mechanism?

A. Stretching the spinal cord

B. Improving axonal transport, reducing intraneural fibrosis and adhesions, reducing inflammation around the nerve, and improving circulation within neural structures — by gliding and tensioning the nerve in controlled ways

C. Strengthening nerve conduction

D. Removing herniated disc material

✓ **Answer: B**

💡 **Rationale & Explanation:**

Neural mobilization mechanisms (proposed): 1) INTRANEURAL CIRCULATION improvement — gentle oscillatory sliding mobilization

increases blood flow within neural tissue, reduces ischemic pain; 2) AXOPLASMIC TRANSPORT enhancement — movement promotes flow of nutrients along the axon; 3) REDUCE INTRANEURAL EDEMA — gentle movement pumps fluid out of edematous neural tissue; 4) REDUCE ADHESIONS — gentle sliding breaks down minor adhesions between the nerve and surrounding structures (nerve sleeve release); 5) REDUCE SENSITIZATION — normalizes afferent input from mechanically sensitized nerves. Techniques: NEURAL SLIDERS (one joint moves to tension the nerve while the adjacent joint relaxes — creates a sliding motion); NEURAL TENSIONERS (both joints move simultaneously to increase neural tension — stronger technique, use with caution in acute presentations).

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107. The 'HVLAT' (high-velocity low-amplitude thrust) manipulation produces its clinical effects through which mechanism?

A. Fracturing adhesions

B. A combination of: cavitation (joint pop), neurophysiological effects (immediate reduction in muscle spasm and pain sensitization via rapid discharge of joint mechanoreceptors), and biomechanical repositioning of the joint

C. Laser photobiomodulation

D. Stretching the intervertebral disc

✓ Answer: B

💡 Rationale & Explanation:

HVLAT manipulation mechanisms: 1) CAVITATION: the rapid joint gapping causes dissolved gas (CO_2, N_2) in the synovial fluid to form a bubble that collapses → the characteristic 'pop'. The pop correlates with: sudden increase in joint volume; cavitation bubble collapse. 2) NEUROPHYSIOLOGICAL: rapid mechanoreceptor discharge → inhibits nociceptive input (pain gate); activates descending pain inhibitory pathways; reduces muscle spasm reflexively (sudden discharge inhibits alpha motor neuron activity via GTO). 3) BIOMECHANICAL: may restore joint mobility by releasing capsular adhesions or 'realigning' a facet joint from a minor positional fault. Note: a pop is NOT required for

clinical benefit — neurophysiological effects occur even without audible cavitation. The 'pop' is reassuring to patients but is not the mechanism of benefit.

├─ ORTHOPEDIC REHABILITATION

108. 'Patella alta' (high-riding patella) is associated with increased risk of:

A. Meniscal tears

B. PATELLAR INSTABILITY and DISLOCATION — the patella sits above the femoral trochlear groove, reducing bony constraint and predisposing to lateral subluxation/dislocation

C. ACL tears

D. Achilles tendinopathy

✓ Answer: B

💡 **Rationale & Explanation:**

Patella alta: the patella sits HIGHER than normal relative to the tibial tuberosity and the femoral trochlea. Assessment: Insall-Salvati ratio = patellar tendon length / patellar length (normal 0.8-1.2; alta = >1.2). Clinical consequences: The patella engages the trochlear groove LATER during knee flexion → it must negotiate entry into the groove with less bony guidance → increased LATERAL DISLOCATION RISK. Also: increased patellofemoral contact pressure when it finally engages the trochlea (at higher flexion angles). Associated with: patellar dislocation, PFPS, patella fractures from direct contact. Patella alta is often associated with trochlear dysplasia (flat trochlea) — a dangerous combination for patellar stability. Assessed by X-ray or MRI sagittal imaging. Surgical options: tibial tubercle distalization (Fulkerson procedure) for recurrent instability with alta.

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109. In hip osteoarthritis rehabilitation, the exercise program that has the STRONGEST evidence for reducing pain and improving function is:

A. Passive stretching alone

B. Progressive resistance training targeting HIP ABDUCTORS + HIP EXTENSORS + QUADRICEPS combined with cardiovascular exercise — land or water-based

C. Rest and activity avoidance

D. Manual therapy alone without exercise

✓ Answer: B

💡 **Rationale & Explanation:**

Hip OA exercise evidence: the most effective intervention combines: PROGRESSIVE RESISTANCE TRAINING targeting the key hip muscles (gluteus medius and maximus, quadriceps) — builds a 'muscular corset' around the deteriorating joint, reducing pain and joint load. HIP ABDUCTOR STRENGTHENING reduces the Trendelenburg moment (lateral force on the femoral head). CARDIOVASCULAR EXERCISE (walking, cycling, swimming) maintains general fitness and contributes to weight management. AQUATIC EXERCISE: excellent for severely limited patients (buoyancy reduces joint loading while allowing exercise). The OPTIMAL DOSAGE: moderate intensity (6/10 exertion), 2-3 sessions/week, 12 weeks minimum. The combination of exercise + patient education + weight management (if BMI elevated) produces the best outcomes and delays hip arthroplasty. Exercise should continue lifelong.

├— ORTHOPEDIC ASSESSMENT

110. The 'wrist extension test' (prayer sign or reverse prayer sign) for carpal tunnel syndrome is:

A. Maximum wrist flexion (Phalen's test) — already covered

B. Extended wrist DORSIFLEXION test (reverse Phalen's): holding both wrists in maximum EXTENSION — POSITIVE if symptoms in median nerve distribution within 60 seconds

C. Wrist rotation test

D. Finger extension test

✓ **Answer: B**

💡 **Rationale & Explanation:**

Reverse Phalen's test (wrist extension test): the patient places the backs of both hands together with wrists in maximum EXTENSION (dorsiflexion) and holds for 60 seconds. This compresses the carpal tunnel's anterior content — the median nerve. POSITIVE = numbness, tingling, or pain in the median nerve distribution (thumb, index, middle, radial half of ring) within 60 seconds. Sensitivity ~43%, specificity ~74%. COMPARE: PHALEN'S TEST = maximum WRIST FLEXION (the more commonly tested and more sensitive test for CTS). Both tests increase carpal tunnel pressure through different mechanisms and can be used together to improve diagnostic accuracy. The combination of Phalen's + Tinel's + Reverse Phalen's + symptom history provides the highest diagnostic yield for CTS.

ORTHOPEDIC REHABILITATION

111. 'Dry land swimming' exercises for swimmers with shoulder pain are designed to:

A. Replace water training entirely

B. Simulate the shoulder mechanics of swimming using resistive bands to strengthen the rotator cuff and scapular stabilizers in the sport-specific movement patterns without the water's resistance and speed

C. Stretch the shoulder only

D. Train the legs

✓ **Answer: B**

💡 **Rationale & Explanation:**

Dry land shoulder training for swimming: swimmers commonly develop shoulder impingement and rotator cuff tendinopathy. Specific rehabilitation considerations: INTERNAL ROTATION dominance in freestyle and butterfly → train external rotation endurance; HIGH VOLUME of overhead loading → the rotator cuff must be highly

conditioned; SCAPULAR STABILIZATION critical — the serratus anterior and lower trapezius must maintain optimal scapular positioning during the hundreds of strokes per training session. Dry land training with RESISTIVE BANDS simulates the catch and pull-through phases of swimming — allowing: progressive overload without water resistance unpredictability, rehabilitation-specific movement patterns, neuromuscular pre-conditioning for return to water. Always combine dry land with in-water technique modification (stroke mechanics — reducing shoulder impingement positions).

ORTHOPEDIC ASSESSMENT

112. In gait assessment, 'hip drop' or 'Trendelenburg pattern' is most clearly visible when:

A. Watching the patient from the front during double support

B. Observing from BEHIND during single-limb stance on the AFFECTED side — the pelvis drops on the CONTRALATERAL side (non-stance side), indicating ipsilateral gluteus medius weakness or hip pain

C. Watching foot clearance during swing

D. Assessing arm swing

✓ Answer: B

💡 Rationale & Explanation:

Trendelenburg gait observation: best observed from BEHIND the patient. As the patient stands on the AFFECTED leg (single-limb support), watch the OPPOSITE (contralateral) side of the PELVIS. In Trendelenburg gait: the contralateral pelvis DROPS (sags downward) because the stance-side gluteus medius cannot hold the pelvis level. The trunk may also lean TOWARD the affected side (compensated Trendelenburg or 'gluteus medius lurch') — a compensation to reduce the demand on the weak Gmed by moving the body weight over the hip. Key for PRC boards: the HIP on the STANCE SIDE is the weak/painful one; the DROP is on the SWING SIDE (contralateral). Don't confuse these — it's a common exam trap.

ORTHOPEDIC REHABILITATION

113. In the treatment of shoulder impingement, posterior capsule stretching is indicated when:

A. Posterior shoulder pain only

B. Posterior shoulder TIGHTNESS (reduced internal rotation in 90° abduction = glenohumeral internal rotation deficit / GIRD) — which causes the humeral head to translate SUPEROPOSTERIORLY, worsening impingement

C. Anterior instability is present

D. After total shoulder replacement

✓ Answer: B

💡 **Rationale & Explanation:**

Posterior capsule tightness and impingement: GIRD (Glenohumeral Internal Rotation Deficit) is common in overhead athletes (pitchers, swimmers, tennis players) — the posterior capsule thickens and tightens from repeated microtrauma. Effects: posterior capsule tightness causes the INSTANT CENTER OF ROTATION to shift superoposteriorly → the humeral head rides up and back → subacromial impingement + SLAP lesion risk. Assessment: compare internal rotation bilaterally at 90° abduction — >20° side-to-side difference = GIRD. Treatment: POSTERIOR CAPSULE STRETCHING — the 'cross-body stretch' (horizontal adduction across chest) and the 'sleeper stretch' (sidelying, internally rotate the arm with shoulder at 90°). These are ESSENTIAL for overhead athletes with impingement + GIRD. Caution: don't stretch the posterior capsule if anterior instability is present.

SPORTS REHABILITATION

114. Hamstring muscle strain classification: Grade II involves:

A. Muscle soreness without structural damage

B. PARTIAL TEAR of the hamstring muscle — pain with activity, some strength loss, palpable tenderness, some swelling/bruising, positive MMT finding — requires 3-6 weeks rehabilitation

C. Complete muscle rupture

D. Bone avulsion at the ischial tuberosity

✓ Answer: B

💡 **Rationale & Explanation:**

Hamstring strain grading: GRADE I: microscopic tears, mild pain, no or minimal strength loss, full ROM, minimal ecchymosis — returns to sport 1-2 weeks. GRADE II: PARTIAL TEAR — moderate pain, palpable tenderness over the muscle belly or myotendinous junction, swelling and ecchymosis, strength loss (positive MMT), limited and painful active knee flexion — 3-6 weeks rehabilitation. GRADE III: COMPLETE RUPTURE or significant avulsion — severe pain, complete strength loss, palpable gap in the muscle, extensive bruising — may require surgical repair for proximal hamstring avulsions, 3-6+ months. MOST COMMON LOCATION: the proximal myotendinous junction of the BICEPS FEMORIS long head — especially in explosive sprinting athletes. Rehabilitation: POLR (Protection, Optimal Loading, Rehabilitation) with progressive eccentric loading (Nordic hamstring program for prevention).

├— ORTHOPEDIC REHABILITATION

115. In the rehabilitation of WRIST FRACTURES (distal radius), the MOST important early goal during immobilization is:

A. Strengthening the wrist flexors

B. Maintaining ELBOW, SHOULDER, and FINGER ROM (tendon gliding exercises) while the wrist is in cast — preventing stiffness in the uninvolved joints and reducing edema

C. Stretching the wrist extensors

D. Avoiding all hand movement

✓ **Answer: B**

💡 **Rationale & Explanation:**

Wrist fracture early rehabilitation (immobilization phase): while the wrist is in a CAST (typically 4-6 weeks for distal radius fractures), PT focuses on the UNINVOLVED JOINTS: 1) SHOULDER: prevent frozen shoulder from disuse (shoulder circles, pendulums); 2) ELBOW: maintain flexion/extension and rotation (if elbow not included in cast); 3) FINGER TENDON GLIDING: tendon gliding exercises prevent finger stiffness — full fist, straight fist, hook fist, tabletop position, straight digit. Also: EDEMA management (elevation, retrograde massage, compression); PAIN management; education on safe cast hygiene. After cast removal: immediate wrist ROM, gradual strengthening, proprioception, functional grip training. The goal: have the patient return to near-full hand function within 3-4 months of fracture.

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116. The 'OPTIMAL' dosage of manual therapy for musculoskeletal conditions according to current evidence is:

A. One session is sufficient for all conditions

B. INDIVIDUALIZED — typically 6-12 sessions over 4-8 weeks, combined with exercise, addressing the identified hypomobility or pain; reassessed every 2-4 sessions to confirm progress

C. Daily manual therapy for at least 6 months

D. Passive manual therapy without exercise

✓ **Answer: B**

💡 **Rationale & Explanation:**

Manual therapy dosage: current evidence supports: 1) COMBINATION with exercise is superior to either alone for most musculoskeletal conditions (spinal pain, shoulder, knee OA); 2) DURATION: most RCTs show benefits from 6-12 sessions; beyond 12-15 sessions without significant progress = reassess diagnosis and approach; 3) FREQUENCY: typically 1-2x/week initially, reducing as patient progresses and

exercise program is established; 4) INDIVIDUALIZATION: based on assessment findings, patient goals, and response to treatment; 5) REASSESSMENT: after every 2-4 sessions to confirm objective improvement (ROM, pain, function); if no improvement after 3-6 sessions = reconsider diagnosis, change technique, or refer. 'More is not always better' — passive manual therapy without progression to active exercise creates dependency and fails to address underlying drivers of pain and disability.

├— ORTHOPEDIC ASSESSMENT

117. The 'Beighton score' measures:

A. Hip joint stability

B. GENERALIZED JOINT HYPERMOBILITY — scores 9 criteria testing hypermobility in the fingers, thumbs, wrists, spine, and knees (score ≥5/9 in adults = generalized hypermobility)

C. Shoulder strength

D. Ankle laxity only

✓ Answer: B

💡 **Rationale & Explanation:**

Beighton Score (9-point scale): Tests for generalized joint hypermobility. Items (each scored 0 or 1 bilaterally, except spinal): 1) Passive 5th finger dorsiflexion >90° (1 point each side = 2 points); 2) Thumb touches forearm (passive flexion) (1 each = 2 points); 3) Elbow hyperextension >10° (1 each = 2 points); 4) Knee hyperextension >10° (1 each = 2 points); 5) Forward trunk flexion with palms flat on floor (1 point). Total = 9. THRESHOLD: ≥4/9 (children) or ≥5/9 (adults) = generalized joint hypermobility (GJH). GJH may be asymptomatic or associated with hypermobility spectrum disorder (HSD) or hypermobile EDS (hEDS). PT relevance: hypermobile patients need STABILITY training (not more stretching); bracing and proprioception training; graduated loading to develop muscle support for lax joints.

ORTHOPEDIC REHABILITATION

118. 'Scapular dyskinesis' refers to:

A. Bony fracture of the scapula

B. ALTERED SCAPULAR MOVEMENT PATTERNS — abnormal position (protraction, downward rotation, anterior tilt) or altered movement timing during arm elevation — contributing to shoulder impingement and rotator cuff pathology

C. Winging of the scapula only

D. Scapular muscle contracture

✓ Answer: B

💡 Rationale & Explanation:

Scapular dyskinesis: any visibly abnormal scapular movement during arm elevation. Types: TYPE I = inferior angle prominence (anterior tilt); TYPE II = medial border prominence (IR or downward rotation); TYPE III = superior border elevation (early shrug sign). Causes: rotator cuff pathology, labral tears, AC joint injury, poor posture (rounded shoulders), thoracic hyperkyphosis, serratus anterior or lower trapezius weakness. Assessment: 'scapular dyskinesis test' — observe the scapula during repeated arm elevation (1-2 kg weight). Clinical significance: abnormal scapular kinematics → reduced subacromial space → supraspinatus impingement → rotator cuff tendinopathy. TREATMENT: scapular stabilization exercises (lower/middle trapezius, serratus anterior strengthening), postural retraining, thoracic spine mobilization, kinesiology tape facilitation.

ORTHOPEDIC ASSESSMENT

119. The 'Lelli test' (anterior knee drawer in terminal extension) specifically tests:

A. The PCL

B. The ACL in full extension — the patient supine, the examiner lifts both limbs by the great toes — the affected knee falls into slight flexion due to the ACL-deficient knee being unable to maintain full extension under gravity

C. Patellar tendon integrity

D. The MCL in extension

✓ Answer: B

💡 **Rationale & Explanation:**

Lelli test (lever sign): the patient lies supine; examiner places a fist under the proximal leg and applies downward pressure to the distal thigh/patella. In a NORMAL knee: the foot rises off the table (the knee acts as a lever with the proximal support point). ACL DEFICIENCY: the foot stays on the table — the knee cannot generate the posterior tibial force needed to lift the foot because the ACL is absent. This test has reported SENSITIVITY ~96% and SPECIFICITY ~99% in some studies — potentially superior to the Lachman test. However, other studies report lower accuracy. The Lelli test is emerging in PT examination literature as a high-accuracy ACL test. Combined with Lachman and pivot shift = comprehensive ACL assessment battery.

├— ORTHOPEDIC REHABILITATION

120. A patient post-ACL reconstruction is CLEARED for jogging at approximately:

A. 4 weeks post-op

B. 3 months (12 weeks) post-op — when: full extension, ROM >120° flexion, no effusion, quad LSI >70%, pain-free single-leg activities achieved

C. 12 months post-op only

D. 6 months post-op for all patients

✓ Answer: B

💡 **Rationale & Explanation:**

ACL post-op return to jogging timeline (evidence-based): before allowing jogging, the patient must achieve: 1) FULL PASSIVE EXTENSION (0°) — essential; 2) FLEXION ≥120°; 3) NO EFFUSION (effusion = quad inhibition → unsafe loading); 4) QUADRICEPS STRENGTH: single-leg LSI ≥70% (many programs now use >80%) on hop testing or isokinetic testing; 5) PAIN-FREE single-leg activities (mini squat, step-down); 6) NORMAL GAIT on treadmill. Typically achievable at 10-14 weeks in uncomplicated cases. Jogging is then introduced on a TREADMILL (controlled environment) → outdoor flat surface → return to sport activities. The '12-month rule' is for full return to contact/cutting sports — not for jogging, which can begin much earlier when criteria are met.

ORTHOPEDIC ASSESSMENT

121. The 'Anterior impingement test' of the ankle is performed by:

A. Dorsiflexing the ankle maximally

B. Passive or active ankle dorsiflexion in a WEIGHT-BEARING lunge position that reproduces anterior ankle pain — indicating anterior soft tissue or bony impingement

C. Plantarflexing the ankle against resistance

D. Inverting the ankle in plantarflexion

✓ **Answer: B**

💡 **Rationale & Explanation:**

Anterior ankle impingement: pain and/or restriction at the ANTERIOR ankle joint, caused by: soft tissue impingement (meniscoid lesions, synovial folds — common in athletes after ankle sprain); osteophytes on the anterior tibial rim or talar neck ('footballer's ankle'); pinching of the anterolateral capsule. Test: maximal DORSIFLEXION in a weight-bearing LUNGE reproduces anterior ankle pain and/or restriction — particularly the knee-to-wall lunge test (measuring dorsiflexion ROM).

Normal: knee to wall at ≥10-12 cm from wall. Restricted + anterior pain = anterior impingement. Treatment: joint mobilization (posterior talar glide), manual therapy to the anterior capsule, surgical osteophyte resection for bony impingement.

ORTHOPEDIC REHABILITATION

122. The recommended PT intervention sequence for a patient with adhesive capsulitis (frozen shoulder) in the STIFFENING phase is:

A. Forceful manipulation under anesthesia immediately

B. GENTLE end-range mobilization (Maitland Grade III-IV) + home stretching + thermotherapy (heat before stretching) — patient education about the natural history and expected timeline

C. Complete rest of the shoulder

D. Aggressive daily stretching to full range

✓ Answer: B

💡 Rationale & Explanation:

Frozen shoulder (stiffening/frozen phase) management: the STIFFENING PHASE (months 4-9 approximately) is where PT is most effective. Evidence-based approach: 1) THERMOTHERAPY: moist heat before treatment to warm the capsule and improve collagen extensibility; 2) MANUAL THERAPY: joint mobilizations targeting the inferior, posterior, and anterior capsule (Grade III-IV oscillations at end range) in all restricted directions; 3) HOME STRETCHING: patient-performed capsular stretches (pendulums, towel stretch for IR, doorway stretch for ER, finger-walk for FF, cross-body stretch for posterior capsule); 4) PATIENT EDUCATION: frozen shoulder typically resolves in 2-3 years — realistic expectations reduce anxiety and improve compliance; 5) Avoid: aggressive forced stretching under anaesthesia in the early stiffening phase — risk of capsular tear, hemarthrosis, CRPS. Hydrodilatation is an evidence-supported option for the stiffening phase.

ORTHOPEDIC ASSESSMENT

123. The 'talar tilt test' assesses:

A. Talar osteochondral defects

B. CFL (calcaneofibular ligament) integrity — the examiner inverts the hindfoot in 20° of plantarflexion; excessive inversion compared to the contralateral side indicates CFL laxity

C. ATFL integrity only

D. Peroneal tendon stability

✓ Answer: B

💡 **Rationale & Explanation:**

Talar tilt test: examiner holds the heel and inverts the HINDFOOT (calcaneus + talus together) with the ankle in approximately 20° PLANTARFLEXION (to relax the ATFL while isolating the CFL). The degree of inversion/tilting of the talus within the mortise is compared bilaterally. POSITIVE: >5-10° more tilt on the affected side, or soft end-feel. Tests the CALCANEOFIBULAR LIGAMENT (CFL). Compare: ANTERIOR DRAWER TEST of the ankle (ATFL) — push calcaneus anteriorly with ankle in 20° plantarflexion, examiner supports the tibia. POSITIVE = anterior translation >3-4 mm compared to contralateral = ATFL disruption. Together, the anterior drawer + talar tilt give information about the two most commonly injured lateral ankle ligaments.

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124. In lumbar spine examination, the 'prone press-up' (passive lumbar extension) test is used to:

A. Assess hamstring tightness

B. Determine if LUMBAR EXTENSION centralizes or relieves the patient's pain (McKenzie directional preference testing — key treatment-direction indicator)

C. Test L5 nerve root compression

D. Assess hip flexor flexibility

✓ **Answer: B**

💡 **Rationale & Explanation:**

Prone press-up test (McKenzie lumbar extension test): the patient lies prone; the examiner performs passive lumbar extension by pressing the lumbar spine into extension (or the patient actively presses up like a cobra pose). The examiner monitors symptom change: CENTRALIZATION (peripheral pain moves toward the midline of the spine) = EXTENSION is the directional preference → prescribe extension exercises. PERIPHERALIZATION (symptoms move more distally) = extension is WRONG direction → test flexion. NO CHANGE = may be derangement without directional preference, dysfunction, or postural syndrome. The prone press-up is the FIRST extension test in the McKenzie examination sequence, followed by standing extension if needed. The centralization response with this test is one of the strongest predictors of success with conservative PT management.

ORTHOPEDIC REHABILITATION

125. The 'step-down test' (stair step-down) is used clinically to assess:

A. Hip flexor strength

B. Single-limb stability, neuromuscular control, and DYNAMIC VALGUS ALIGNMENT during slow eccentric knee flexion — correlates with hip abductor weakness and PFPS risk

C. Knee hyperextension

D. Ankle plantarflexion strength

✓ **Answer: B**

💡 **Rationale & Explanation:**

Step-down test (eccentric step-down): the patient stands on a step and slowly lowers the opposite foot to the floor, then returns to standing — controlled single-leg squat to approximately 30° knee flexion. Assessments: DYNAMIC VALGUS (knee falls inward = hip abductor weakness / gluteus medius insufficiency); TRUNK LATERAL LEAN

(gluteus medius lurch compensation); PELVIC DROP (Trendelenburg); FOOT PRONATION (subtalar instability). Used for: PFPS assessment, return-to-sport functional testing, ACL risk screening (particularly in female athletes with poor hip abductor strength). Research: a positive step-down test (dynamic valgus) in asymptomatic athletes predicts future ACL injury and PFPS development. Hip abductor strengthening reduces dynamic valgus and is a frontline PFPS treatment.

├— MANUAL THERAPY

126. The 'Cyriax method' of orthopaedic medicine uses which concept for tissue diagnosis?

A. The ICF model

B. SELECTIVE TISSUE TENSION TESTING — comparing responses to active movement, passive movement, and resisted testing to identify WHICH TISSUE (contractile or inert) is at fault

C. Trigger point palpation only

D. Neurodynamic testing

✓ Answer: B

💡 Rationale & Explanation:

Cyriax selective tissue tension testing: James Cyriax's systematic approach to identify the specific tissue causing pain. ACTIVE MOVEMENT: requires muscle AND joint function — limited or painful with both contractile and inert tissue problems. PASSIVE MOVEMENT: only moves inert tissues (capsule, ligaments, bursae) — painful with inert tissue problems; if painful = inert tissue at fault. RESISTED MOVEMENT (isometric): ONLY stresses contractile tissues (muscles, tendons) with no joint movement — if painful = contractile tissue (muscle or tendon) at fault; if strong and painful = tendinopathy or partial tear; if weak and painless = complete tear or neurological. CAPSULAR PATTERN: specific limitation pattern for each joint indicating capsular involvement (e.g., shoulder: ER > Abd > IR). This framework is still widely taught and tested in Philippine PT education.

ORTHOPEDIC ASSESSMENT

127. The 'Thompson squeeze test' for Achilles tendon rupture is performed by:

A. Palpating the Achilles tendon for tenderness

B. Squeezing the calf with the patient prone — POSITIVE = no plantar flexion of the foot (normally, squeezing the calf muscle belly causes passive plantar flexion through the intact Achilles)

C. Resisted plantarflexion against gravity

D. Passive dorsiflexion of the ankle

✓ Answer: B

💡 Rationale & Explanation:

Thompson (Simmonds) test: patient prone with feet hanging off the edge of the table (or kneeling on a chair). Examiner squeezes the MIDPORTION OF THE CALF firmly. NORMAL: the foot plantar flexes (the squeeze compresses the gastrocnemius-soleus, transmitting force through the intact Achilles tendon). POSITIVE: foot does NOT plantar flex = ACHILLES TENDON RUPTURE (the force cannot be transmitted to the calcaneus). Sensitivity ~96%, specificity ~93% — one of the most accurate special tests in musculoskeletal assessment. Always perform bilaterally to confirm. Also check for: Achilles continuity palpation, palpable gap (sometimes present), excessive resting dorsiflexion on the affected side. Do NOT confuse with Achilles tendinopathy (tendinopathy = pain/stiffness without rupture — Thompson test NEGATIVE).

ORTHOPEDIC REHABILITATION

128. 'Aquatic therapy' using the HALLIWICK concept is specifically designed for:

A. Competitive swimming training

B. Teaching PEOPLE WITH DISABILITIES to achieve WATER INDEPENDENCE through a 10-point program — emphasizing disengagement from flotation aids and developing rotational control and balance in water

C. Cardiorespiratory conditioning in elite athletes

D. Deep water running for athletes

✓ Answer: B

💡 **Rationale & Explanation:**

Halliwick concept (James McMillan, 1949): a water-specific program originally developed for people with physical disabilities. 10-point program: Mental adjustment → Disengagement (from flotation aids) → Transverse rotation control → Sagittal rotation control → Longitudinal rotation control → Combined rotation control → Upthrust (water support) → Balance in stillness → Turbulent gliding → Simple progression (basic swimming movements). Key principle: WATER INDEPENDENCE — the person is taught to control their body in water using the physical properties of water (buoyancy, turbulence, resistance) WITHOUT flotation aids. Applied to: cerebral palsy, MS, SCI, stroke, ABI, and anyone with neuromotor disabilities. In Philippine PT, the Halliwick concept is used in aquatic PT programs for neurologically and physically disabled populations.

├─ ORTHOPEDIC ASSESSMENT

129. The 'anterior drawer test' for the shoulder is used to assess:

A. ACJ stability

B. ANTERIOR GLENOHUMERAL INSTABILITY — the examiner stabilizes the scapula and applies an anterior directed force to the humeral head; positive = excessive anterior translation and patient apprehension/discomfort

C. Biceps tendon integrity

D. Supraspinatus tear

✓ **Answer: B**

💡 **Rationale & Explanation:**

Anterior shoulder drawer test (Gerber and Ganz): patient sitting or supine. Examiner: one hand stabilizes the scapula (holds the coracoid and spine of scapula), other hand grasps the proximal humerus. Apply an ANTERIOR FORCE to the humeral head while stabilizing the scapula. POSITIVE: excessive anterior translation (>25% of the humeral head width) compared to the opposite side, OR the patient becomes apprehensive. Grade the laxity: Grade 0 = no translation; Grade 1 = up to 25% translation; Grade 2 = up to 50%; Grade 3 = >50% or locking over rim. Compare: POSTERIOR DRAWER = applying posterior force = tests posterior instability. SULCUS SIGN = inferior traction = tests inferior instability. Together, these three directions complete the glenohumeral instability assessment.

ORTHOPEDIC REHABILITATION

130. Eccentric exercise for the quadriceps (e.g., wall slides, single-leg squats) is indicated for which knee condition?

A. Meniscal tears — to develop quadriceps force

B. Patellofemoral pain syndrome and patellar tendinopathy — eccentric loading builds quad-tendon strength and reduces pain by promoting collagen remodeling and reducing sensitization

C. Post-TKA early phase (first 2 weeks)

D. Acute knee dislocation

✓ **Answer: B**

💡 **Rationale & Explanation:**

Eccentric quadriceps training for patellofemoral and patellar tendon conditions: PATELLAR TENDINOPATHY: eccentric decline squats (25° declined board, single-leg squat) — the decline reduces ankle contribution and maximally loads the patellar tendon eccentrically.

Protocol: 3 sets × 15 reps, twice daily, into pain (NRS 3-4/10 acceptable). PATELLOFEMORAL PAIN SYNDROME: eccentric step-downs, wall slides (controlled knee flexion) target VMO and overall quad mechanics. Why eccentric? 1) Higher force per cross-sectional area stimulates MORE COLLAGEN SYNTHESIS; 2) Mechanical loading remodels disorganized tenocytes; 3) Stimulates sensory-motor adaptation reducing pain; 4) Builds the tendon's load capacity progressively. Eccentric exercise is the evidence-based cornerstone of both patellar and quadriceps tendinopathy management.

├— ORTHOPEDIC ASSESSMENT

131. The 'passive neck flexion' test for lumbar nerve root tension is:

A. A test for cervical radiculopathy

B. Passive cervical flexion that INCREASES LUMBAR or LEG SYMPTOMS — indicating neural tension from lumbar disc herniation (the spinal cord and dural sac are tensioned by neck flexion, propagating through to lumbar nerve roots)

C. A test for thoracic spine mobility

D. A test for headache

✓ Answer: B

💡 **Rationale & Explanation:**

Passive neck flexion (Lindner's test / Neck flexion test): the examiner passively flexes the patient's neck while they are supine or sitting. POSITIVE: this reproduces or INCREASES the patient's lumbar or leg symptoms (sciatica, lumbar pain). The mechanism: neck flexion tensions the DURA MATER and spinal cord from above — this tensile force propagates all the way down to the lumbar neural structures. If there is a lumbar disc herniation or nerve root adhesion, the additional tension from neck flexion will stress that already sensitized neural tissue. This is a NEURODYNAMIC SENSITIZING MANEUVER — used as part of the slump test to confirm neural origin of symptoms. Compared

to Lhermitte's sign (neck flexion causes UMN signs = spinal cord compression), the passive neck flexion test for LBP is a PNS test.

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132. The 'distraction test' for the cervical spine is used to:

A. Reproduce radicular symptoms

B. RELIEVE radicular arm pain by gently tracting the head upward — a positive (pain relieved) finding suggests nerve root compression and is part of the cervical radiculopathy diagnostic cluster

C. Test vertebral artery integrity

D. Assess CSF pressure

✓ Answer: B

💡 **Rationale & Explanation:**

Cervical distraction test: the examiner cups the patient's occiput and mandible and gently DISTRACTS (tracts upward). POSITIVE: RELIEF of the patient's arm pain or radicular symptoms. Mechanism: traction OPENS the neural foramina → REDUCES nerve root compression → relieves radicular symptoms. This is the OPPOSITE of Spurling's test (which narrows the foramen). COMBINED with Spurling's: distraction test positive + Spurling's positive = very high specificity for cervical radiculopathy (Wainner cluster). Sensitivity for radiculopathy: ~44%, Specificity: ~90%. The distraction test is a useful TREATMENT TECHNIQUE as well — mechanical cervical traction essentially replicates this maneuver. Understanding its mechanism helps explain WHY traction works for cervical radiculopathy.

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133. The 'star excursion balance test anterior direction' normalized reach distance in athletes: what value indicates ELEVATED INJURY RISK?

A. <70% of leg length (LL)

B. Asymmetry >4 cm OR <70% of limb length in the anterior direction — associated with increased risk of lower extremity injury, particularly ANKLE SPRAIN and ACL TEAR

C. <90% of leg length

D. Any asymmetry at all

✓ Answer: B

💡 **Rationale & Explanation:**

SEBT/Y-Balance anterior reach: the ANTERIOR reach direction most closely isolates hip flexor and quadriceps eccentric control, while requiring significant ankle dorsiflexion and single-leg balance. Research by Plisky et al. (2006): athletes with anterior SEBT <70% of limb length had 2.7× greater risk of lower extremity injury. ASYMMETRY >4 CM between limbs is another clinical cutoff for injury risk identification. In ACL return-to-sport testing: Y-balance test is included in the criterion-based return-to-sport battery — LSI >90% for Y-balance in all three directions helps confirm neuromuscular readiness. In ankle sprain rehabilitation: progressive SEBT training specifically targets the peroneals and ankle proprioceptors that are damaged in ankle sprains.

├─ MANUAL THERAPY

134. The 'Upledger craniosacral therapy' approach claims to treat by:

A. Cervical spine manipulation

B. Detecting and treating subtle rhythmic CRANIOSACRAL MOTION (purported pulsation of CSF 6-12 cycles/minute) through very gentle touch on the skull, sacrum, and spine

C. High velocity manipulation

D. Joint mobilization techniques

✓ Answer: B

💡 **Rationale & Explanation:**

Craniosacral therapy (CST): developed by John Upledger, building on William Sutherland's osteopathic cranial concept. THEORETICAL BASIS: the craniosacral system produces a rhythmic motion (craniosacral rhythm, 6-12 cycles/minute) transmitted through the dural membranes, cerebrospinal fluid, and bones of the skull and sacrum. Practitioners claim to detect this rhythm through gentle touch and treat 'restrictions' in the system. EVIDENCE: WEAK — the inter-rater reliability of detecting craniosacral rhythm is very low; clinical trials

show mixed results; the anatomical basis of the craniosacral rhythm is disputed. DESPITE limited evidence, CST is practiced by some PTs and is widely available. PT should understand it exists and have an evidence-based discussion with patients who request it. Not recommended as a primary intervention for conditions with stronger evidence-based alternatives.

├— ORTHOPEDIC REHABILITATION

135. The 'functional brace' (post-operative or functional ACL brace) purpose is:

A. Completely prevent knee motion

B. Provide PROPRIOCEPTIVE FEEDBACK and SOME STRUCTURAL SUPPORT to the knee — studies show functional ACL braces do not significantly prevent re-injury in ACL-deficient knees but may provide PSYCHOLOGICAL CONFIDENCE and proprioceptive enhancement, particularly in return-to-sport phases

C. Prevent muscle atrophy

D. Provide electrical stimulation

✓ Answer: B

💡 **Rationale & Explanation:**

Functional knee bracing after ACL injury/reconstruction: PROPRIOCEPTIVE ROLE: the brace's contact with the skin stimulates mechanoreceptors → improved proprioceptive acuity in some studies. STRUCTURAL PROTECTION: biomechanical studies show functional ACL braces do NOT reliably prevent the anterior tibial translation that damages the ACL graft — their mechanical effectiveness is limited. PSYCHOLOGICAL BENEFIT: patients report feeling more confident with a brace → may allow earlier return to sport. CLINICAL USE: post-operative phase 1-6 months for protection during rehabilitation; some surgeons prescribe for the first 1-2 years of return to sport (controversial). Current evidence does NOT strongly support routine functional bracing for all ACL reconstruction patients — individualize

based on patient preference, sport demands, and surgeon recommendation.

ORTHOPEDIC ASSESSMENT

136. The 'Kendall Thomas test' modification for distinguishing PSOAS from RECTUS FEMORIS from TFL tightness looks for:

A. SLR limitation

B. Three simultaneous findings: 1) Hip rises = PSOAS tight; 2) Knee extends from flexed position = RECTUS FEMORIS tight; 3) Leg abducts = TFL tight — these can co-exist

C. Back pain reproduction

D. Hip clicking

✓ Answer: B

💡 **Rationale & Explanation:**

Modified Thomas test differentiation: when the test leg is lowered toward the table: If the HIP RISES off the table (cannot fully extend) = ILIOPSOAS (hip flexor) TIGHTNESS. If the KNEE EXTENDS from its flexed position (thigh on table but knee angle opens up) = RECTUS FEMORIS TIGHTNESS (the biarticular muscle pulls the knee into extension as it's stretched at the hip). If the leg ABDUCTS outward = TENSOR FASCIAE LATAE / ITB TIGHTNESS. In clinical practice, patients often have COMBINATIONS: e.g., hip rises AND knee extends = both iliopsoas AND rectus femoris tight. Each component requires its own specific stretch: iliopsoas = hip extension stretch; rectus femoris = kneeling with knee bent stretch; TFL = sidelying stretch with leg neutral or slightly extended.

SPORTS REHABILITATION

137. The 'modified Harter sport confidence inventory' and 'ACL-RSI' are used to assess:

A. Physical readiness for return to sport

B. PSYCHOLOGICAL READINESS for return to sport after ACL reconstruction — the ACL-RSI (Return to Sport after Injury) measures: emotions about returning, risk appraisal (fear of re-injury), and sport confidence — score ≥65/100 is typically required for return to sport

C. Cardiovascular fitness

D. Functional hop test performance

✓ Answer: B

💡 **Rationale & Explanation:**

Psychological readiness tools for ACL RTS: ACL-RSI (Ardern et al.): 12-item questionnaire measuring: EMOTIONS (fear, nervousness, apprehension); RISK APPRAISAL (belief about re-injury risk, concerns about performance); CONFIDENCE (feeling confident in the knee, feeling mentally prepared). Each item 0-100, total averaged → score 0-100. Score ≥65 = adequate psychological readiness for return to sport. Evidence: >50% of athletes who fail to return to pre-injury sport do so for PSYCHOLOGICAL reasons despite physical readiness. ACL re-tear rate in athletes cleared on time + functional tests alone is ~23-25%; incorporating psychological readiness screening reduces this risk. The ACL-RSI is now a RECOMMENDED COMPONENT of comprehensive RTS assessment alongside strength testing and hop tests.

├─ ORTHOPEDIC REHABILITATION

138. The 'Kaltenborn-Evjenth approach' to joint mobilization emphasizes:

A. Oscillatory grade I-IV mobilizations

B. TRACTION combined with GLIDES based on the CONCAVE-CONVEX RULE — using SUSTAINED techniques rather than oscillatory techniques, and systematically addressing hypomobility through a SEGMENTAL APPROACH

C. Massage only

D. Manipulation only

✓ **Answer: B**

💡 **Rationale & Explanation:**

Kaltenborn-Evjenth (Nordic) approach: complements Maitland's approach with: 1) TRACTION before glides (to decompress the joint); 2) SUSTAINED techniques (rather than Maitland's oscillatory rhythmic techniques) — sustained forces may better creep through viscoelastic tissue; 3) GRADED TRACTION (Grade I = piccolo/neutralize; Grade II = takes up slack; Grade III = stretches capsule); 4) APPLICATION of concave-convex rule to determine glide direction; 5) SEGMENTAL assessment and treatment of hypomobility. Both Maitland and Kaltenborn approaches are evidence-based for manual therapy, and experienced clinicians integrate both. The key conceptual difference: Maitland = oscillatory grades for pain or stiffness; Kaltenborn = sustained traction + directional glides based on accessory movement loss.

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139. In knee OA rehabilitation, 'lateral wedge insoles' are used for:

A. Lateral compartment OA

B. MEDIAL COMPARTMENT OA — the lateral wedge tilts the foot/ankle into EVERSION, shifting the ground reaction force laterally → REDUCES the knee adduction moment → reduces load on the MEDIAL COMPARTMENT

C. Patellofemoral OA

D. Posterior cruciate injuries

✓ **Answer: B**

💡 **Rationale & Explanation:**

Lateral wedge insoles for medial knee OA: the MEDIAL COMPARTMENT is the most commonly affected in knee OA (due to natural varus alignment in most people). A LATERAL WEDGE (thicker on the lateral side) placed in the shoe tilts the foot into EVERSION (pronation), which mechanically shifts the ground reaction force LATERALLY at the knee →

REDUCES the KNEE ADDUCTION MOMENT (KAM) — the medial compartment loading force. Evidence: lateral wedge insoles reduce KAM by ~4-8%; clinical outcomes show modest but clinically meaningful pain reduction and function improvement in medial compartment OA. IMPORTANT: lateral wedges are NOT appropriate for lateral compartment OA (would worsen it) or for patients with flat feet (already everted — further eversion may worsen symptoms). Combine with: strengthening, weight management, activity modification.

ORTHOPEDIC ASSESSMENT

140. The 'FAOS' (Foot and Ankle Outcome Score) is the foot/ankle equivalent of:

A. WOMAC for the hip

B. KOOS for the knee — a patient-reported outcome measure specific to FOOT AND ANKLE conditions with subscales for pain, symptoms, ADL, sport/recreation, and quality of life

C. NDI for the neck

D. ODI for the back

✓ Answer: B

💡 Rationale & Explanation:

FAOS (Foot and Ankle Outcome Score): modeled after the KOOS, it assesses outcomes specifically for FOOT AND ANKLE conditions (ankle sprains, Achilles tendinopathy, plantar fasciitis, ankle OA, post-surgical outcomes). 5 subscales: Pain (9 items), Symptoms (7 items — including swelling and stiffness), Activities of Daily Living (17 items), Sport and Recreation Function (5 items), Quality of Life (4 items). Each subscale scored 0-100 (100 = no problems). MCID: approximately 10-15 points. FAOS is sensitive to change with PT interventions for ankle conditions and is increasingly used in research and clinical practice. Know the region-specific PROMSs: DASH = upper extremity; NDI = cervical; ODI = lumbar; KOOS = knee; HOOS = hip; FAOS = foot/ankle; WOMAC = knee/hip OA in older adults.

MANUAL THERAPY

141. The 'counterstrain' technique requires the practitioner to:

A. Stretch the painful muscle

B. Find a TENDER POINT, position the patient in MAXIMUM COMFORT (shortening the involved tissue), hold for EXACTLY 90 SECONDS, then slowly return to neutral — the tender point should decrease ≥70% in tenderness

C. Apply high-velocity thrust

D. Use electrical stimulation simultaneously

✓ Answer: B

💡 **Rationale & Explanation:**

Strain-Counterstrain protocol (Lawrence Jones): 1) LOCATE the TENDER POINT: palpate and find the specific tender point (often a knot or tender spot in the muscle or fascia — Jones' specific anatomical points are mapped); 2) ESTABLISH BASELINE: note the tenderness level (0-10); 3) POSITION FOR COMFORT: move the body slowly into the position that REDUCES tenderness by 70-80% (this is the 'counterstrain position' — it shortens the involved muscle); 4) HOLD FOR 90 SECONDS (the critical duration — activates inhibitory reflexes, resets the muscle spindle); 5) SLOWLY RETURN to neutral (fast return can reactivate the tender point); 6) REASSESS the tender point. Mechanism: hypothetically, an exaggerated stretch reflex ('strain') is relieved by shortening the tissue ('counterstrain'), normalizing muscle spindle output. Particularly useful for acute, highly irritable conditions.

ORTHOPEDIC REHABILITATION

142. 'Eccentric decline squats' for patellar tendinopathy are performed on a DECLINED (25°) surface because:

A. It makes the exercise harder generally

B. The decline REDUCES ANKLE DORSIFLEXION DEMAND — isolating the ECCENTRIC QUADRICEPS/PATELLAR TENDON LOAD without the calf muscle contribution to the movement; this maximizes the therapeutic loading stimulus on the patellar tendon

C. It provides ankle support

D. It reduces knee flexion range

✓ Answer: B

💡 **Rationale & Explanation:**

Decline squat mechanism: standard squats involve significant ANKLE DORSIFLEXION (calf and soleus absorb some of the load). On a DECLINED SURFACE (board angled 25° downward at the heel): the ankle dorsiflexion requirement is reduced → the knee/quad/patellar tendon must bear a GREATER proportion of the load → HIGHER PATELLAR TENDON STRESS. For PATELLAR TENDINOPATHY treatment: this increased, focused loading on the patellar tendon is the THERAPEUTIC GOAL. The patellar tendon needs progressive, specific loading to stimulate remodeling. Evidence: single-leg decline squat program (Alfredson-style, 3×15 reps twice daily) shows superior results compared to flat ground squats for patellar tendinopathy because of this isolated tendon loading effect. After pain-free movement is achieved with decline squats, progress to plyometrics.

├— ORTHOPEDIC ASSESSMENT

143. The 'piano key sign' at the wrist (DRUJ) versus the 'piano key sign' at the AC joint differ in:

A. They test the same structure

B. WRIST PIANO KEY SIGN: tests DRUJ stability — examiner pushes down on the ULNAR HEAD; if it bounces back up (like a piano key), indicates DRUJ instability (disrupted TFCC or distal radioulnar ligaments). AC JOINT PIANO KEY SIGN: tests AC joint separation —

distal clavicle pushed down, bounces back up from superior displacement

C. They use the same technique

D. The wrist test is more specific

✓ Answer: B

💡 **Rationale & Explanation:**

Piano key sign disambiguation: WRIST (DRUJ instability test): examiner stabilizes the radius and pushes the ULNA HEAD dorsally or volarly — positive if the ulna can be displaced more than the contralateral side, indicating TFCC tear or distal radioulnar ligament disruption. The term 'piano key sign' is sometimes used when the ulna head is dorsally prominent and springy. AC JOINT (piano key sign for AC separation Grade III+): examiner pushes the DISTAL CLAVICLE down (reduces the superior displacement) — positive when it springs back up when released, confirming complete AC and CC ligament disruption. Both tests use the 'push and spring back' concept — but on completely different joints and structures. Context and anatomy are key to interpreting which test is being described.

├— ORTHOPEDIC REHABILITATION

144. The 'graded motor imagery' (GMI) program for CRPS consists of THREE sequential stages:

A. Assessment, treatment, discharge

B. 1. LEFT-RIGHT DISCRIMINATION (identify limb laterality in images), 2. IMAGINED MOVEMENTS (mentally perform movements of the affected limb without actual movement), 3. MIRROR THERAPY (mirror visual feedback of the unaffected limb) — each stage must be mastered before progressing

C. Pain mapping, injection, and surgery

D. Passive movement, stretching, strengthening

✓ Answer: B

💡 **Rationale & Explanation:**

Graded Motor Imagery (Moseley): a 3-stage sequential program for CRPS and phantom limb pain that progressively re-trains the cortical representation of the affected limb. STAGE 1 (LEFT-RIGHT DISCRIMINATION): the patient rapidly identifies whether images of limbs are left or right (using the Recognize app/NOI group materials) — this implicit motor imagery activates the premotor cortex without activating the fear-pain cycle. Takes 2-3 weeks to normalize. STAGE 2 (IMAGINED MOVEMENTS): patient explicitly IMAGINES moving the affected limb — activates motor circuits without actual movement or pain. Takes 2-3 weeks. STAGE 3 (MIRROR THERAPY): the unaffected limb's movements are reflected in a mirror — provides visual feedback of 'normal' movement for the affected limb's cortical representation. Each stage must produce minimal symptom exacerbation before progressing. Total program: ~6 weeks. Evidence: Level 1 for CRPS and phantom limb pain.

├— ORTHOPEDIC ASSESSMENT

145. The 'active compression test' (O'Brien's test) for SLAP tears is positive when:

A. External rotation relieves pain

B. The THUMB-DOWN position (full IR, 90° shoulder flexion, 15° horizontal adduction, resisted downward pressure) reproduces DEEP SHOULDER PAIN that is RELIEVED when the position is repeated with the THUMB UP (ER/supination)

C. Pain worsens with supination

D. Anterior apprehension is elicited

✓ **Answer: B**

💡 **Rationale & Explanation:**

O'Brien's active compression test for SLAP: SETUP: arm at 90° forward flexion, 15-20° horizontal adduction (across midline). TEST 1: forearm

PRONATED, thumb DOWN. Examiner applies DOWNWARD FORCE while patient resists. TEST 2: forearm SUPINATED, thumb UP. Same resistance. POSITIVE FOR SLAP: DEEP shoulder pain (inside the joint) in the THUMB DOWN position that is REDUCED or ABSENT in the THUMB UP position. Mechanism: thumb-down supinates the biceps attachment on the labrum → stresses the superior labrum. Thumb-up decompresses this stress. POSITIVE FOR AC JOINT: SUPERIOR shoulder pain (on top of the shoulder) in the thumb-down position, reduced with thumb-up. The LOCATION of pain (deep inside vs. on top) distinguishes SLAP from AC joint pathology — a critical clinical distinction.

├— ORTHOPEDIC REHABILITATION

146. In management of knee OA, the evidence-based first-line treatment recommended by OARSI guidelines is:

A. Total knee replacement as soon as OA is diagnosed

B. EXERCISE THERAPY (land and water-based), WEIGHT MANAGEMENT (if BMI >25), and PATIENT EDUCATION — before considering injections or surgery

C. Hyaluronic acid injections

D. Complete activity restriction

✓ Answer: B

💡 **Rationale & Explanation:**

OARSI (Osteoarthritis Research Society International) Guidelines for Knee OA first-line management: STRONGLY RECOMMENDED (all knee OA patients): 1) EXERCISE — aerobic, strengthening, neuromuscular (all have Level 1a evidence); 2) WEIGHT MANAGEMENT (if overweight/obese) — each kg lost reduces knee load by 3-4 kg; 3) SELF-MANAGEMENT EDUCATION — understanding OA, pain management strategies, activity pacing. CONDITIONALLY RECOMMENDED: NSAIDS, duloxetine, TENS. NOT RECOMMENDED: acetaminophen for moderate-severe OA (limited efficacy), hyaluronic

acid injections (controversial evidence). SURGERY: reserved for failure of conservative management for 3-6+ months and significant quality of life impairment. The PT's role is central to OARSI guideline management — exercise therapy IS the guideline-recommended first-line treatment.

ORTHOPEDIC ASSESSMENT

147. The 'plantar fascia stretch test' (Windlass test) reproduces plantar fasciitis symptoms by:

A. Passive ankle dorsiflexion only

B. Passive dorsiflexion of the HALLUX (big toe) while the patient is standing or non-weight-bearing — loading the plantar fascia via the windlass mechanism — POSITIVE = pain at the proximal plantar fascia origin on the calcaneus

C. Pressing on the heel

D. Squeezing the midfoot

✓ Answer: B

💡 Rationale & Explanation:

Windlass test for plantar fasciitis: the examiner (or the patient) passively dorsiflexes the HALLUX (1st MTP joint) — either in non-weight-bearing (modified windlass test) or weight-bearing position. POSITIVE: sharp pain at the MEDIAL CALCANEAL TUBERCLE (plantar fascia origin on the heel). Mechanism: hallux dorsiflexion tightens the plantar fascia via the windlass mechanism → increased tension at the proximal calcaneal attachment → reproduces the characteristic plantar fasciitis pain. Sensitivity: 32% (non-weight-bearing), but higher in weight-bearing (combined stress). High SPECIFICITY (>95%) — if positive, almost certainly plantar fasciitis. Combined with: point tenderness at medial calcaneal tubercle + pain worst in the morning or after rest → highly diagnostic for plantar fasciitis without imaging required.

ORTHOPEDIC REHABILITATION

148. The 'superior labrum anterior posterior' (SLAP) classification: Type II (most common in athletes) involves:

A. Simple labral tear without biceps involvement

B. DETACHMENT of the SUPERIOR LABRUM + BICEPS ANCHOR from the glenoid — the biceps anchor is avulsed, creating instability of the biceps long head

C. Bucket-handle superior labral tear

D. Posterior labral extension only

✓ Answer: B

💡 Rationale & Explanation:

SLAP classification (Snyder): Type I = fraying/degenerative tearing of superior labrum (labrum still attached, biceps anchor intact); Type II = MOST COMMON in throwers — detachment of the BICEPS ANCHOR + superior labrum from the glenoid (the biceps tendon pulls off its attachment); Type III = bucket-handle tear of superior labrum with intact biceps anchor; Type IV = bucket-handle tear that extends into the biceps tendon. TYPE II SLAP rehabilitation: conservative PT for 3-6 months first (rotator cuff + scapular stabilization + posterior capsule stretching for GIRD); if conservative management fails: surgical repair (arthroscopic suture anchors). Return to throwing: 6-9 months after surgical repair. Key: the biceps decelerates the elbow in follow-through — it transmits massive tensile loads at the biceps anchor, explaining why throwers develop Type II SLAP.

ORTHOPEDIC ASSESSMENT

149. The 'DASH questionnaire' is validated for measuring upper extremity disability in conditions including:

A. Lumbar back pain

B. ANY UPPER EXTREMITY CONDITION — from shoulder (rotator cuff, instability) to elbow (lateral epicondylitis), wrist (CTS, fractures), and hand (trigger finger, CRPS)

C. Lower extremity only

D. Neurological stroke only

✓ Answer: B

💡 **Rationale & Explanation:**

DASH (Disabilities of the Arm, Shoulder and Hand): validated for virtually ANY upper extremity musculoskeletal condition. 30-item questionnaire covering: daily life activities, work activities, sport/performing arts, and symptom items. Score 0-100 (0 = no disability). MCID: ~10-15 points. The optional WORK MODULE and SPORT/PERFORMING ARTS MODULE make it adaptable to specific occupational or athletic contexts. Advantages: single questionnaire for all UE conditions — allows cross-condition comparisons. Limitations: region-specific scores are not calculated (unlike KOOS which has separate subscales). The QuickDASH (11 items) takes 2 minutes and is validated for time-pressured clinical settings. The DASH is the most widely used UE-specific PROM in PT research worldwide.

├— ORTHOPEDIC REHABILITATION

150. 'Augmented soft tissue mobilization' (ASTM / IASTM / Graston technique) physiological effects include:

A. Permanent scar tissue removal

B. DISRUPTION OF COLLAGEN CROSS-LINKS, STIMULATION OF FIBROBLAST ACTIVITY, INCREASED LOCAL BLOOD FLOW, and NEUROPHYSIOLOGICAL PAIN MODULATION — resulting in improved tissue extensibility and reduced pain in fibrotic/tendinopathic tissue

C. Nerve regeneration

D. Bone remodeling

✓ **Answer: B**

💡 **Rationale & Explanation:**

IASTM physiological mechanisms: 1) MECHANICAL: the instrument edge creates controlled MICROTRAUMA in the fibrotic tissue → disrupts excessive collagen cross-links → allows tissue remodeling; 2) BIOLOGICAL: stimulates FIBROBLAST proliferation and activity → new, more organized collagen synthesis; 3) VASCULAR: increases local BLOOD FLOW (hyperemia visible after treatment) → tissue nutrition; 4) NEUROPHYSIOLOGICAL: activates descending pain inhibitory pathways (similar to deep pressure massage); 5) TRIGGER POINT RELEASE: the instrument pressure on trigger points may cause the same mechanisms as manual trigger point release. POST-TREATMENT: tissue is ready for stretching (heated, more extensible) → always follow IASTM with stretching and/or exercise. Common adverse effects: temporary bruising, local soreness (2-3 days). Contraindications: open wounds, active infection, hematoma, bony areas without soft tissue protection.

ORTHOPEDIC ASSESSMENT

151. The 'modified Schober test' measures:

A. Hip flexion

B. LUMBAR FLEXION RANGE OF MOTION — two marks are made 10 cm above and 5 cm below the lumbosacral junction (S1); the distance between the marks increases with forward bending; normal is an increase of at least 5 cm (from 15 cm to ≥20 cm)

C. Thoracic kyphosis

D. SIJ mobility

✓ **Answer: B**

💡 **Rationale & Explanation:**

Modified Schober test for lumbar flexion: Mark: S1 (dimples of Venus), 10 cm above, 5 cm below → total 15 cm distance. Patient bends

forward maximally. MEASURE the new distance between marks. NORMAL: increases by at least 5 cm → ≥20 cm total. REDUCED (< 5 cm increase): indicates limited lumbar flexion — seen in: ankylosing spondylitis (where Schober is the standard monitoring test — values <2 cm indicate severe restriction), chronic LBP with stiffness, hyperlordosis. The Schober test specifically measures LUMBAR SPINE MOBILITY — not hamstring flexibility (which affects gross trunk flexion measurement). Compare with 'fingertip-to-floor test' (gross trunk forward reach) — this includes both lumbar and hip flexion, less specific. In AS monitoring: serial Schober measurements track disease progression and response to treatment.

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152. The 'Trendelenburg gait vs. antalgic gait' clinical distinction is:

A. Both are identical

B. Trendelenburg: trunk leans TOWARD the AFFECTED (stance) side due to GLUTEUS MEDIUS WEAKNESS; Antalgic: trunk may lean AWAY from the affected side and the STANCE PHASE IS SHORTENED due to PAIN

C. Antalgic gait involves arm swing loss

D. Trendelenburg is from knee pathology

✓ Answer: B

💡 Rationale & Explanation:

Gait deviation differentiation: TRENDELENBURG GAIT: weakness or pain in the hip abductors (gluteus medius) causes two presentations: Uncompensated Trendelenburg = pelvis DROPS on the swing (non-stance) side during single-leg support on the affected side; Compensated Trendelenburg (gluteus medius lurch) = trunk LEANS TOWARD the affected (stance) side to reduce abductor muscle demand. ANTALGIC GAIT: from pain in any part of the lower extremity. Characteristics: SHORTENED STANCE PHASE on the PAINFUL side (patient minimizes time bearing weight on the painful limb); shortened step length from the painful side; often a lateral trunk lean AWAY from pain (to unload). DIFFERENTIATION: Trendelenburg from hip abductor weakness = Trendelenburg sign positive; antalgic from pain = often

positive SLR, joint tenderness, obvious painful movement. Both may be present simultaneously in advanced hip OA.

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153. The 'Apley Scratch test superior component' (reaching behind the head) tests which shoulder motions?

A. Internal rotation + adduction

B. EXTERNAL ROTATION + ABDUCTION + FLEXION — the arm goes overhead and behind the head, requiring adequate ER range, abduction, and some flexion

C. Extension only

D. Horizontal adduction

✓ Answer: B

💡 **Rationale & Explanation:**

Apley Scratch superior test: reaching the hand BEHIND THE HEAD (touching between the shoulder blades): requires EXTERNAL ROTATION (allows the hand to face backward), ABDUCTION (arm lifts away from the trunk), and FLEXION (arm comes forward then behind). Restrictions: limited ER = subscapularis tightness or posterior capsular tightness; limited abduction = impingement, rotator cuff tear, frozen shoulder; limited flexion = anterior capsular tightness. The INFERIOR component (reaching behind the back): requires INTERNAL ROTATION + ADDUCTION + EXTENSION. Common cause of limited inferior reach: subscapularis tightness, posterior capsular tightness. Using the Apley Scratch test, the examiner can quickly screen the entire shoulder ROM and note which components are deficient, guiding further specific goniometric measurement and targeted rehabilitation planning.

├─ MANUAL THERAPY

154. The 'sacroiliac joint distraction test' is performed by:

A. Compressing the iliac crests together

B. Applying lateral DISTRACTION force to both iliac crests (pressing OUTWARD on the anterior superior iliac spines with crossed forearms) — POSITIVE when posterior pelvic/SIJ pain is reproduced

C. Palpating the PSIS

D. Axial loading through the pelvis

✓ Answer: B

💡 **Rationale & Explanation:**

SIJ distraction test (ASIS distraction/gapping test): the examiner places crossed forearms on the ANTERIOR SUPERIOR ILIAC SPINES (ASIS) and applies a POSTEROLATERAL force — effectively distracting the anterior SIJs and compressing the posterior SIJs. POSITIVE: pain in the posterior pelvis/SIJ area = SIJ pathology or posterior sacroiliac ligament stress. The test is one of the 5-test SIJ cluster (Laslett's cluster): distraction + FABER + thigh thrust + compression + Gaenslen's. If ≥3 of 5 are positive → sensitivity ~91%, specificity ~87% for SIJ pain as a diagnosis. Individual SIJ tests have poor sensitivity alone — always use the cluster. The distraction test is often the FIRST SIJ provocation test applied because it's simple and non-threatening for the patient.

├— ORTHOPEDIC ASSESSMENT

155. The 'cross-straight leg raise' (crossed SLR) test is MOST specific for:

A. Piriformis syndrome

B. LARGE CENTRAL OR PARACENTRAL LUMBAR DISC HERNIATION — raising the CONTRALATERAL leg reproduces the patient's IPSILATERAL leg symptoms; specificity ~90% for significant disc herniation

C. IT band tightness

D. Hip OA

✓ Answer: B

💡 **Rationale & Explanation:**

Crossed SLR test: the examiner raises the UNAFFECTED leg (the leg that does NOT have symptoms). POSITIVE: this reproduces pain in the

AFFECTED (symptomatic) leg on the opposite side. Mechanism: raising the contralateral leg tensions the dural sleeve and nerve roots on the IPSILATERAL (symptomatic) side by pulling on the thecal sac — only possible with a LARGE CENTRAL disc herniation that compresses the symptomatic nerve root even when the ipsilateral leg is not being raised. SENSITIVITY: ~25-43% (not sensitive — misses many disc herniations). SPECIFICITY: ~90% (if positive, almost certainly a significant disc herniation, often central or paracentral). Therefore: negative crossed SLR = cannot rule out disc herniation; POSITIVE crossed SLR = highly likely a significant disc herniation that may require imaging and possible surgical consultation.

├— MANUAL THERAPY

156. The 'PARIS approach' (Stayner Paris) to joint mobilization emphasizes:

A. Only oscillatory Grade I techniques

B. A systematic, EVALUATION-BASED approach that MATCHES the treatment technique to the specific biomechanical findings — hypomobility treated with mobilization/manipulation; hypermobility treated with stabilization; normal motion treated with other approaches

C. HVLAT only

D. Muscle energy techniques only

✓ Answer: B

💡 **Rationale & Explanation:**

Paris approach (Stayner Paris framework for manual therapy): an evidence-based, patient-centered approach characterized by: 1) COMPREHENSIVE EVALUATION: active, passive, and resisted testing; posture; palpation; neurological screening; 2) CLINICAL REASONING: determine if the problem is: hypomobility (mobilize/manipulate), hypermobility (stabilize — no mobilization!), normal mobility with pain (pain management techniques), or a contraindication (refer); 3)

MATCHED TREATMENT: if the evaluation reveals L4-L5 hypomobility with restricted flexion and left lateral flexion → apply joint mobilization in those specific directions at that specific level; 4) REASSESSMENT after each technique; 5) HOME PROGRAM aligned with clinical findings. The Paris approach is influential in North American PT education and emphasizes that the right technique for the wrong diagnosis produces poor results. Distinguish hypermobility from hypomobility — applying mobilization to a hypermobile segment worsens instability.

ORTHOPEDIC REHABILITATION

157. For patients with MEDIAL TIBIAL STRESS SYNDROME ('shin splints'), the primary risk factors include:

A. Tibial fracture history only

B. ABRUPT INCREASE IN TRAINING VOLUME OR INTENSITY, OVERPRONATION (flat foot), WORN-OUT FOOTWEAR, HARD TRAINING SURFACES, FEMALE SEX, and VITAMIN D/CALCIUM DEFICIENCY

C. Running on grass only

D. Poor arm swing

✓ Answer: B

💡 Rationale & Explanation:

Medial tibial stress syndrome (MTSS) risk factors: TRAINING ERRORS: the most common cause — rapid increase in running mileage or intensity without adequate recovery (the 'too much, too soon' syndrome). BIOMECHANICAL: excessive PRONATION increases tibial torsional stress; leg length discrepancy; hip abductor weakness causing increased pronation. FOOTWEAR: worn-out shoes lose cushioning and motion control; inappropriate shoe type for foot mechanics. SURFACE: hard surfaces (concrete, asphalt) generate higher impact forces vs. grass or tracks. BONE HEALTH: females with low bone density (RED-S — relative energy deficiency in sport) are at high risk for stress fractures (more serious than MTSS). MUSCLE WEAKNESS: weak hip

abductors, weak ankle stabilizers. TREATMENT: relative rest (reduce volume 50%), correct the modifiable risk factors, progressive return to running, orthotic intervention for overpronation, strength and conditioning. Distinguish from tibial stress fracture (localized, point-tenderness, positive tuning fork test, positive MRI) — stress fractures need more complete rest.

├— ORTHOPEDIC ASSESSMENT

158. The 'hip internal rotation in prone' test (measuring passive hip IR in prone position with knee at 90°) is used to assess:

A. Hip flexor tightness

B. FEMORAL ANTEVERSION — excessive passive hip IR (>45-50°) combined with LIMITED hip ER suggests increased femoral anteversion (inward twisting of the femur)

C. Piriformis length

D. IT band tightness

✓ Answer: B

💡 Rationale & Explanation:

Femoral anteversion measurement in prone: with the patient PRONE and knee at 90° flexion, the examiner passively internally and externally rotates the hip by swinging the lower leg. Normal: IR ≈ 30-40°, ER ≈ 40-50°. EXCESSIVE ANTEVERSION (increased femoral torsion): passive IR markedly increased (>50-60°); passive ER decreased; the patient tends to sit in 'W-sitting' and walk with inward-facing toes ('in-toeing'). RETROVERSION: IR decreased, ER increased. Clinical significance: excessive anteversion contributes to: dynamic knee valgus collapse (increased ACL injury risk); patellofemoral pain syndrome; hip impingement; characteristic 'Charlie Chaplin' gait if combined with tibial torsion. PT implications: can't change bony torsion with therapy (only surgery can); instead: strengthen external rotators and hip abductors to control dynamic alignment; teach movement pattern corrections; shoe inserts if needed.

ORTHOPEDIC REHABILITATION

159. The 'kinesiological tape' (KT Tape, Rocktape) application for MUSCLE FACILITATION uses:

A. 15% stretch, applied against the muscle action direction

B. 15-25% ELASTIC TENSION, applied FROM ORIGIN TO INSERTION (in the direction of muscle action) — the slight tension in the direction of muscle contraction is hypothesized to facilitate muscle activation and provide proprioceptive feedback

C. 50% stretch applied anywhere

D. Full stretch with no direction

✓ Answer: B

💡 **Rationale & Explanation:**

Kinesiology tape muscle facilitation: DIRECTION: from the muscle's ORIGIN toward its INSERTION — same direction as the muscle's contraction. TENSION: 15-25% elastic stretch (moderate tension — not fully stretched). PROPOSED MECHANISM: 1) The tensioned tape pulls slightly on the skin in the direction of muscle action → tactile/proprioceptive input that facilitates motor unit activation; 2) The tape provides sensory feedback about muscle position → enhances body awareness; 3) Lifts the skin slightly → decompresses underlying tissues → may reduce pain that inhibits muscle activation. Used for: weak VMO (PFPS), inhibited gluteus medius (hip surgery), weak tibialis anterior (foot drop), weak scapular stabilizers. Compare INHIBITION tape: INSERTION to ORIGIN (opposite direction), 10-15% tension → inhibits overactive muscle (e.g., upper trapezius in cervicogenic headache). Evidence: moderate for pain and proprioception benefits; weaker for direct strength facilitation.

ORTHOPEDIC ASSESSMENT

160. The 'scapular assistance test' (SAT) and 'scapular retraction test' (SRT) help determine if scapular dysfunction is contributing to shoulder symptoms by:

A. Assessing shoulder flexion strength

B. MANUALLY ASSISTING or RETRACTING the scapula during provocative shoulder movements — if symptoms REDUCE with manual scapular correction, scapular retraining is likely to be beneficial as part of rehabilitation

C. Testing for labral tears

D. Assessing AC joint separation

✓ Answer: B

💡 **Rationale & Explanation:**

Scapular clinical tests: SCAPULAR ASSISTANCE TEST (SAT): examiner manually upwardly rotates and posteriorly tilts the scapula (mimicking normal scapular motion) while the patient performs the painful arc or shoulder elevation. POSITIVE (clinically useful): symptoms REDUCE when the examiner corrects scapular position → scapular dysfunction is contributing to the symptoms → scapular stabilization training will help. SCAPULAR RETRACTION TEST (SRT): examiner manually retracts the scapula (squeezes the medial border posteriorly) during resisted shoulder abduction testing. If shoulder ABDUCTION STRENGTH improves with scapular retraction → the unstable/protracted scapula is reducing shoulder abduction force → scapular stabilization will improve shoulder function. These simple clinical tests help justify and direct the inclusion of scapular exercises in the treatment plan — improving patient education and treatment planning rationale.

├— ORTHOPEDIC REHABILITATION

161. The 'Return to Play' (RTP) criteria after hamstring strain injury requires:

A. Absence of pain only

B. FULL PAIN-FREE ROM, hamstring strength ≥90% LSI on isokinetic testing OR acceptable strength on functional tests, sprint test without pain, sport-specific movements completed, and passing psychological readiness assessment

C. 3 weeks rest

D. Passive stretching pain-free

✓ Answer: B

💡 **Rationale & Explanation:**

RTP criteria after hamstring strain (current evidence 2024): CRITERION-BASED rather than TIME-BASED: 1) PAIN-FREE FULL RANGE: passive SLR symmetric bilaterally; active knee extension no pain; 2) STRENGTH: hamstring LSI ≥90% on isokinetic testing (eccentric H:Q ratio ≥0.6); OR acceptable results on functional strength tests (single-leg bridge, Nordic hamstring hold time symmetric); 3) SPRINT CAPACITY: running at sport speed (8-10 m/s for field athletes) without discomfort; progressive sprint protocol (50-60-70-80-90-100% speed increments); 4) SPORT-SPECIFIC MOVEMENTS: cutting, kicking, pivoting — all pain-free; 5) PSYCHOLOGICAL READINESS: player/athlete self-reports readiness; 6) TIME guidance: Grade I = 7-14 days; Grade II = 3-6 weeks; Grade III = 8-12+ weeks — use as minimum timeframe, not the only criterion. Re-injury rate with premature RTP (≤2 weeks total) is high (>15% same-season recurrence). The BHT (British Hamstrings Test) and Askling tests guide readiness assessment.

├— ORTHOPEDIC ASSESSMENT

162. The 'hip FADIR sign' compared to 'hip impingement test' — clinically they are:

A. Completely different tests

B. THE SAME TEST — FADIR (Flexion, ADduction, Internal Rotation) IS the hip impingement test (anterior impingement test); both describe the same provocative maneuver for femoroacetabular impingement (FAI) and labral tear

C. Different angles are used

D. One is active, one is passive

✓ **Answer: B**

💡 **Rationale & Explanation:**

FADIR = hip impingement test = anterior impingement test: all describe the SAME maneuver: patient supine, examiner passively moves the hip into 90° FLEXION + ADDUCTION + INTERNAL ROTATION simultaneously. POSITIVE: anterior groin pain. Tests for: FAI (cam or pincer type), labral tear, synovitis. This position creates anterior impingement between the femoral neck/head and the acetabular rim. SENSITIVITY: ~96% (excellent screening test — if negative, FAI/labral tear less likely). SPECIFICITY: ~25% (many false positives — hip OA, psoas impingement, bursitis can also produce positive). Used as a SCREENING TEST: if positive → confirm with MRI arthrogram (the gold standard for labral tear diagnosis). The high sensitivity means it 'catches' most cases; the low specificity means a positive alone is not diagnostic. Understanding that different names describe the same test reduces confusion in clinical communication.

├— ORTHOPEDIC REHABILITATION

163. The 'hip abductor strengthening' program for PFPS (patellofemoral pain syndrome) aims to correct:

A. Quadriceps weakness

B. EXCESSIVE DYNAMIC KNEE VALGUS (from inadequate hip external rotation and abduction control) — strengthening the GLUTEUS MEDIUS reduces the femoral internal rotation and adduction that causes the patella to track laterally, contributing to PFPS pain

C. Ankle instability

D. Trunk rotation

✓ **Answer: B**

💡 **Rationale & Explanation:**

Hip strengthening for PFPS rationale: the biomechanical chain: WEAK GLUTEUS MEDIUS → inadequate control of hip ER and abduction during loading → HIP INTERNALLY ROTATES AND ADDUCTS → creates DYNAMIC KNEE VALGUS → the FEMUR internally rotates while the foot remains fixed → the patella appears to track LATERALLY relative to the trochlea (actually the trochlea moves medially under the patella) → increased lateral patellar stress → PFPS. Hip strengthening intervention: gluteus medius exercises (sidelying abduction, clamshell, hip hike, lateral band walk, single-leg squat) → reduces dynamic valgus during functional activities → reduces patellofemoral pain. Multiple high-quality RCTs confirm: hip abductor + hip ER strengthening produces superior outcomes to quad-focused rehabilitation alone for PFPS. This is a fundamental PT board examination concept.

SPORTS REHABILITATION

164. The 'POLR protocol' for hamstring strains during the acute phase stands for:

A. Physiotherapy, Operations, Loading, Return

B. PROTECTION (avoid activities that stress the healing muscle), OPTIMAL LOADING (gentle isometric contractions at comfortable range — not complete rest), REASSURANCE, ICE (if needed for symptom control) — a modern replacement for the traditional complete rest protocol

C. Passive, Open, Lateral, Rotation

D. Pressure, Oil, Light, Resistance

✓ Answer: B

💡 **Rationale & Explanation:**

POLR (modern acute hamstring strain management): replaces the outdated 'RICE only' protocol. PROTECTION: avoid sprinting, overstretching, high-load eccentric activities during the first 48-72 hours. OPTIMAL LOADING: early ISOMETRIC CONTRACTIONS (submaximal, pain-free range) begin within 24-48 hours — prevents

complete immobilization atrophy, maintains structural integrity of healing fibers, and promotes organized collagen deposition. REASSURANCE: patient education about normal healing, realistic timeline, avoiding catastrophizing. ICE: for comfort — not critical for healing (per PEACE & LOVE evidence). Why not complete rest? Immobilization produces: worse collagen organization (scar tissue), greater stiffness, longer recovery time. Early controlled loading produces: better aligned collagen, faster functional recovery. Progression after POLR: submaximal isometrics → isotonic through range → eccentric loading (Nordic) → running → sport-specific. Timelines depend on Grade I, II, or III injury.

ORTHOPEDIC REHABILITATION

165. The 'McKenzie retraction exercise' for cervical pain involves:

A. Neck extension maximally

B. Gentle RETRACTION of the head straight backward (chin in, not down) — correcting the forward head posture and reducing cervical disc pressure anteriorly; particularly effective for centralization of cervical radiculopathy symptoms with an extension directional preference

C. Cervical lateral flexion

D. Cervical rotation exercises

✓ Answer: B

💡 Rationale & Explanation:

McKenzie cervical retraction: the patient slides the head straight BACKWARD (not chin-to-chest flexion, not extension — but a horizontal retraction). Effect: restores normal cervical lordosis; reduces forward head posture; reduces anterior disc pressure in the C5-C6 and C6-C7 levels (most common herniation sites); can centralize radicular arm pain in patients with extension directional preference (the majority of cervical disc herniation patients). TECHNIQUE: patient can do this actively (sitting or lying) or the therapist can assist passively.

The retraction movement is followed by a retraction + extension combination for patients who need more extension loading. Cervical retraction exercises have strong evidence for reducing neck pain and cervical radiculopathy. Patient education: retraction is an ACTIVE SELF-CARE STRATEGY — taught as a home exercise to perform frequently (hourly if tolerated) throughout the day.

├— ORTHOPEDIC ASSESSMENT

166. The 'joint line tenderness' test for meniscal injury has what sensitivity and what does it test?

A. 30% sensitivity, tests ACL

B. 75-85% SENSITIVITY for meniscal tear — palpation of the medial (for medial meniscus) or lateral (for lateral meniscus) joint line for tenderness; the most sensitive INDIVIDUAL clinical finding for meniscal pathology despite its simplicity

C. 50% sensitivity, tests MCL

D. 90% sensitivity, tests ACL

✓ Answer: B

💡 **Rationale & Explanation:**

Joint line tenderness (JLT): the examiner palpates the medial and lateral JOINT LINE of the knee (between the tibial and femoral condyles) for FOCAL TENDERNESS. SENSITIVITY for meniscal tear: ~75-85% — actually one of the HIGHEST sensitivity values among individual meniscal tests (higher than McMurray alone). SPECIFICITY: ~60-70% (less specific — many conditions cause JLT including MCL injury, capsular pathology). Clinical use: JLT positive = very likely a meniscal injury (or at minimum, a structure at the joint line is involved). Combine with: McMurray test + Thessaly test + joint effusion assessment + history (locking, giving way, mechanism) for the most accurate diagnosis. Despite its simplicity, JLT should NEVER be omitted from a knee examination — it may be the most informative single finding for meniscal pathology.

ORTHOPEDIC REHABILITATION

167. For a patient with FROZEN SHOULDER in the ADHESIVE (frozen/stiffening) phase, the therapeutic goal is:

A. Complete pain relief immediately

B. PROGRESSIVE RESTORATION OF ROM while managing pain — using Grade III-IV end-range mobilization, home stretching (pendulums, doorway stretch, behind-back stretch), thermotherapy before stretching, and patient education about the natural history

C. Complete immobilization

D. Surgical release immediately

✓ Answer: B

💡 Rationale & Explanation:

Frozen shoulder adhesive phase PT goals and approach: PHASE I (PAINFUL phase, ~0-9 months): minimize pain, maintain existing ROM, avoid aggressive mobilization that exacerbates inflammation. PHASE II (ADHESIVE/FROZEN phase, ~4-9 months): PRIMARY GOAL = progressive ROM recovery. Approach: HEAT before therapy (paraffin, moist heat — improves capsular extensibility); GRADE III-IV MOBILIZATION (working through resistance at end range in restricted directions — inferior, posterior, anterior capsular stretching); HOME STRETCHING: pendulums (gravity-assisted distraction), cross-body stretch (posterior capsule), doorway stretch (anterior capsule/ER), progressive behind-back IR stretch; PATIENT EDUCATION: set realistic expectations (recovery takes 1-3 years total; the adhesive phase can last 4-6 months). PHASE III (THAWING): spontaneous gradual recovery of ROM — PT transitions to more aggressive stretching and functional exercise. Surgery (MUA or arthroscopic capsular release) is reserved for severe, prolonged cases unresponsive to conservative PT after 12-18 months.

ORTHOPEDIC ASSESSMENT

168. The 'grind test' for the first carpometacarpal (CMC-1 or trapeziometacarpal) joint diagnoses:

A. Scaphoid fracture

B. FIRST CMC JOINT OSTEOARTHRITIS (basal joint OA of the thumb) — axial compression and rotation of the thumb metacarpal into the trapezium produces pain and/or crepitus = positive test

C. CTS

D. De Quervain's disease

✓ Answer: B

💡 Rationale & Explanation:

First CMC grind test (trapeziometacarpal grind test): the examiner grasps the FIRST METACARPAL, applies AXIAL COMPRESSION (forcing the metacarpal base against the trapezium), and ROTATES the metacarpal. POSITIVE: pain, crepitus, or both — indicating FIRST CMC JOINT OSTEOARTHRITIS (thumb basal joint OA). The first CMC joint is the MOST COMMONLY AFFECTED joint by OA in the hand — particularly in post-menopausal women. Presentation: pain at the base of the thumb, pain with pinch and grip activities (turning keys, opening jars), tenderness at the first CMC joint, visible squaring of the thumb base (subluxation and osteophyte formation). PT management: splint (thumb spica — immobilizes the first CMC joint), activity modification, joint protection techniques, exercises when pain allows. Steroid injection for refractory cases. Surgery (trapeziectomy with or without ligament reconstruction) for severe disease.

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169. The 'passive ankle dorsiflexion test in non-weight-bearing' measures gastrocnemius-soleus flexibility. The normal value is:

A. 5° dorsiflexion

B. AT LEAST 10-15° of dorsiflexion with the knee straight (gastrocnemius + soleus); knee bent position tests SOLEUS alone (>20° normal) — if DF improves significantly with knee bent, the

GASTROCNEMIUS is the primary restrictor (two-joint muscle shortening)

C. 30° only

D. 0° (neutral only)

✓ Answer: B

💡 **Rationale & Explanation:**

Ankle dorsiflexion measurement: NON-WEIGHT-BEARING MEASUREMENT (passive, goniometric): KNEE STRAIGHT: ankle DF tests BOTH gastrocnemius + soleus (gastrocnemius crosses both knee and ankle — knee straight stretches it maximally). Normal: ≥10-15°. KNEE BENT (90°): ankle DF tests SOLEUS only (gastrocnemius is slack with the knee bent). Normal: ≥20-25°. INTERPRETATION: if DF is LIMITED with knee straight but NORMAL with knee bent → GASTROCNEMIUS tightness (not soleus). If DF is limited in BOTH positions → SOLEUS tightness (and possibly ankle joint capsular restriction). Clinical relevance: GASTROCNEMIUS TIGHTNESS = most common cause of limited DF. Treatment: knee-straight calf stretch (standing wall stretch, straight knee) targets gastrocnemius; knee-bent calf stretch targets soleus. WEIGHT-BEARING lunge test (knee-to-wall test) is more functional and often used for sports rehabilitation — normal: >10-12 cm from wall to toe.

├— ORTHOPEDIC REHABILITATION

170. The 'deloading' or 'unloading' phase in tendinopathy management is the FIRST stage because:

A. The tendon must be completely rested

B. TENDONS IN THE REACTIVE/EARLY DEGENERATIVE PHASE need a REDUCTION IN LOAD to below the pain and structural tolerance threshold — not complete rest (which causes further degeneration), but load management that keeps symptoms at ≤3/10 during activity

C. High load must be applied immediately

D. Stretching is always the first treatment

✓ **Answer: B**

💡 **Rationale & Explanation:**

Tendinopathy load management stages (Cook and Purdam model): REACTIVE TENDINOPATHY: acutely overloaded tendon — needs load reduction, isometric exercises (analgesic), relative rest from aggravating activities. TENDON DYSREPAIR: chronic overload with disorganized collagen — needs progressive loading (HSR protocol) to stimulate remodeling. DEGENERATIVE TENDINOPATHY: advanced — areas of irreversible degeneration; surrounding normal tissue must be loaded progressively. FIRST STAGE (DELOADING): identify and modify the ACTIVITIES CAUSING THE LOAD SPIKES (e.g., jumping, sprinting for patellar tendinopathy; overhead throwing for rotator cuff tendinopathy). Reduce these specific loads to below the symptom threshold. INTRODUCE ISOMETRICS: tolerated well in the reactive phase; analgesic effect; allows continued muscle loading without high tendon stress. THEN progress to isotonic, heavy slow resistance, plyometrics, sport-specific. Key principle: tendons NEED load to heal — complete rest = ATROPHY + DEGENERATION; appropriate load = ADAPTATION.

├─ ORTHOPEDIC ASSESSMENT

171. The 'drop arm test' sensitivity for rotator cuff tear is approximately:

A. 90%

B. 27-40% — POOR SENSITIVITY but HIGH SPECIFICITY (~88%); a POSITIVE drop arm test nearly always indicates a LARGE rotator cuff tear but many significant tears will have a NEGATIVE test (too sensitive to detect partial tears)

C. 75%

D. 60%

✓ **Answer: B**

💡 **Rationale & Explanation:**

Drop arm test statistics revisited: SENSITIVITY: only ~27-40% — this means the test MISSES 60-73% of rotator cuff tears. Many partial and even some full-thickness tears maintain enough compensatory function to control the lowering of the arm. SPECIFICITY: ~88% — when the test IS positive (arm drops suddenly), it is highly likely a LARGE rotator cuff tear. Clinical implication: NEGATIVE drop arm test does NOT rule out rotator cuff pathology. POSITIVE drop arm test = urgent investigation (MRI or ultrasound). Combined testing is more accurate: Neer's + Hawkins-Kennedy (impingement screening) + empty can (supraspinatus) + external rotation lag sign (infraspinatus) + belly press (subscapularis) + drop arm test gives the best overall sensitivity/specificity battery for rotator cuff pathology. The high-specificity, low-sensitivity tests (like drop arm) are used to CONFIRM findings, not to screen.

├— MANUAL THERAPY

172. The 'soft tissue mobilization' technique of 'myofascial release' differs from 'deep tissue massage' in that:

A. They are identical

B. MYOFASCIAL RELEASE applies SUSTAINED PRESSURE to the myofascial restriction barrier and WAITS FOR THE TISSUE TO RELEASE (elongation) over 90-120 seconds — working with the tissue's viscoelastic properties; deep tissue massage uses ACTIVE, RHYTHMIC pressure strokes to mechanically displace tissue

C. Myofascial release uses instruments

D. Deep tissue massage is always painful

✓ **Answer: B**

💡 **Rationale & Explanation:**

Myofascial release (MFR) vs. deep tissue massage: MFR (John Barnes approach): therapist applies a GENTLE SUSTAINED LOAD to the

perceived fascial restriction; holds the force AT the barrier (where tissue resistance is felt); WAITS without forcing — the viscoelastic 'creep' of the fascial tissue causes it to gradually elongate over 90-120 seconds; the therapist follows the tissue as it releases. Deep tissue massage: ACTIVE, RHYTHMIC, MECHANICAL pressure strokes — deeper than Swedish massage, using thumbs, elbows, or tools to penetrate deep muscle layers and break up adhesions. MFR is INDIRECT (waits for tissue to release) vs. DIRECT (forces the tissue). Evidence for MFR: moderate for reducing pain in myofascial pain, headache, fibromyalgia. Deep tissue massage: strong for reducing DOMS and muscle tightness. Both have utility in PT — the appropriate choice depends on the patient's clinical presentation and tolerance.

ORTHOPEDIC REHABILITATION

173. The 'motor control exercise' for chronic LBP targets which specific muscles first?

A. Erector spinae and quadratus lumborum

B. TRANSVERSUS ABDOMINIS (TrA) and MULTIFIDUS — the deep segmental stabilizers whose delayed and impaired activation has been demonstrated on EMG in chronic LBP patients; restoring their anticipatory activation is the primary goal

C. Hip flexors

D. Hamstrings

✓ Answer: B

💡 **Rationale & Explanation:**

Motor control exercise (MCE) for chronic LBP: TARGET MUSCLES: TRANSVERSUS ABDOMINIS (TrA) — the deepest abdominal muscle, wraps around the trunk like a corset; normally activates BEFORE limb movement (feedforward activation); in chronic LBP, this anticipatory activation is DELAYED or absent. MULTIFIDUS — the deep spinal multifidus (one to two segments) atrophies and its activation is altered in chronic LBP; contributes to segmental control at each vertebral

level. TRAINING APPROACH: 1) ISOLATED ACTIVATION: teach the patient to contract TrA (abdominal drawing-in maneuver — draw the navel toward the spine without moving the pelvis or breathing differently) and multifidus (feel the muscle expand under the finger pads at the lumbar spine) independently; 2) INTEGRATE into movement: maintain TrA + multifidus co-activation during arm/leg lifts in quadruped, then in functional positions; 3) PROGRESS to dynamic functional activities with maintained deep muscle co-activation. MCE has strong evidence (Level 1) for reducing LBP and disability in chronic LBP patients with movement control impairment.

├─ ORTHOPEDIC ASSESSMENT

174. The 'SLUMP position' (slump test starting position) places the patient in:

A. Supine

B. SITTING AT THE EDGE OF THE TABLE with the entire SPINE IN FLEXION (slumped posture) — head and neck flexed, thoracic spine flexed, lumbar spine flexed — this baseline position tensions the neural structures before adding knee extension and ankle dorsiflexion as sensitizing maneuvers

C. Standing

D. Prone

✓ Answer: B

💡 **Rationale & Explanation:**

Slump test mechanics: STARTING POSITION: patient sits at the edge of the table. Step 1: THORACOLUMBAR FLEXION (slump the entire trunk — Maitland's term) — rounds out the entire spine. Step 2: Add CERVICAL FLEXION (bow the head/neck further). Step 3: KNEE EXTENSION of the test leg (as far as possible while maintaining the slump position). Step 4: ANKLE DORSIFLEXION. Each step adds neural tensioning from one end (cervical flexion) while step 3-4 adds tensioning from the other end (sciatic nerve tensioning via SLR

mechanism). POSITIVE: symptoms reproduced with knee extension + DF that are RELIEVED by neck extension. The NEURAL TISSUE is between the two tensioning points — cervical flexion above, ankle DF + knee extension below. Releasing either end (neck extension) should relieve neural symptoms if the neural tissue is the source. Sensitivity for disc herniation/radiculopathy: ~84%, Specificity: ~83%.

├— ORTHOPEDIC REHABILITATION

175. After distal radius (Colles') fracture, which outcome measure is MOST specific to the wrist and forearm function?

A. DASH

B. Patient-Rated Wrist Evaluation (PRWE) — 15-item questionnaire measuring wrist pain (5 items) and wrist function (10 items: specific activities + usual activities); total 100 points (0 = no disability); MCID ~11.5 points; more responsive to wrist-specific changes than the DASH

C. Berg Balance Scale

D. ODI

✓ Answer: B

💡 **Rationale & Explanation:**

PRWE (Patient-Rated Wrist Evaluation, MacDermid): the most wrist-specific PROM available. 15 items: PAIN (5 items — rest, repetitive use, specific activities): 0-50 points. FUNCTION (10 items — 6 specific activities + 4 usual activities): 0-50 points. TOTAL: 0-100 (0 = no impairment, 100 = worst). Validated for: distal radius fractures (most common use), TFCC tears, CTS post-surgery, wrist OA, inflammatory conditions of the wrist. MCID: ~11.5 points. Compare with DASH: measures the entire UE (shoulder, elbow, wrist, hand) — good for multi-region conditions, less sensitive to isolated wrist-specific changes. PRWE is preferred when the primary complaint is wrist-specific. In post-Colles' fracture PT: measure PRWE at baseline, 6 weeks, 12 weeks, and 6 months to document recovery and PT effectiveness. Normal population PRWE scores: <10 points.

ORTHOPEDIC ASSESSMENT

176. The 'resisted shoulder ER' test (with the arm at the side, elbow at 90°) is used to assess:

A. Supraspinatus

B. Infraspinatus and teres minor strength and integrity — weakness on resisted ER suggests posterior rotator cuff tear or inhibition; cannot perform resisted ER = highly suspicious for complete infraspinatus tear

C. Deltoid

D. Subscapularis

✓ Answer: B

💡 Rationale & Explanation:

Resisted ER test for posterior rotator cuff: with the patient's arm at the side and elbow at 90° flexion, the examiner resists EXTERNAL ROTATION. Tests INFRASPINATUS (primary) and TERES MINOR (secondary). WEAKNESS in this position: suggests infraspinatus +/- teres minor tear. The EXTERNAL ROTATION LAG SIGN is more specific for large tears (arm positioned in near-maximum ER, then released — inability to maintain = significant tear). In younger patients: posterior cuff weakness may indicate GHJ instability or nerve damage (suprascapular nerve palsy affects infraspinatus). In overhead athletes: eccentric infraspinatus is critical for shoulder deceleration after a throw — its injury causes both pain and functional limitation in follow-through. Testing ER strength in the SCAPULAR PLANE (90° abduction) vs. the SIDE is different: both assess ER but at different positions; 90° abduction better isolates the infraspinatus portion that decelerates the arm in overhead sport.

ORTHOPEDIC REHABILITATION

177. The 'supine long-sitting test' (Supine to sit test) for sacroiliac joint assessment: the limb that appears SHORTER in supine but becomes LONGER in long-sitting suggests:

A. Leg length discrepancy

B. POSTERIOR ROTATION or UPSLIP of the ipsilateral ILIUM — the apparent leg length change reflects the ilium's position relative to the sacrum, not a true bone length discrepancy

C. True bone length discrepancy

D. Lumbar disc herniation

✓ Answer: B

💡 Rationale & Explanation:

Supine-to-sit test interpretation: with the patient SUPINE: note the position of the medial malleoli relative to each other. In LONG SITTING (hip at 90° flexion, knees extended): note the new position of the malleoli. NORMAL: malleoli remain symmetric. INTERPRETATION (controversial, limited reliability): If a leg appears SHORT in SUPINE but becomes LONG in LONG-SITTING (positive test): suggests POSTERIOR ILIAL ROTATION on that side (the ilium rotates posteriorly when moving to sitting, which pulls the acetabulum inferiorly → apparent lengthening). If the leg appears LONG in supine but SHORT in long-sitting: ANTERIOR ILIAL ROTATION. IMPORTANT CAVEAT: this test has LOW INTER-RATER RELIABILITY (clinicians often disagree on findings). It should ONLY be used as part of a cluster of SIJ tests, not in isolation. More reliable SIJ assessment: provocation tests (5-test cluster) + imaging.

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178. The 'military press' exercise specifically trains:

A. Pectoralis major

B. SHOULDER ABDUCTORS (deltoid) and FLEXORS (anterior deltoid), plus rotator cuff, trapezius (elevation), and triceps for the press component — a compound overhead pressing exercise

C. Biceps

D. Hip extensors

✓ **Answer: B**

💡 **Rationale & Explanation:**

Military press (overhead press) muscles: PRIMARY: anterior and middle DELTOID (shoulder abduction and flexion to 90°+); upper trapezius (scapular elevation and upward rotation); triceps brachii (elbow extension in the press). SECONDARY: rotator cuff (stabilization of humeral head), serratus anterior (scapular upward rotation and protraction), lower trapezius (stabilizes scapula against excessive elevation), core muscles (for spinal stability under load). REHABILITATION SIGNIFICANCE: overhead press is a LATE-STAGE rehabilitation exercise for shoulder conditions — requires adequate impingement clearance, sufficient rotator cuff strength, scapular control. Do NOT introduce early in impingement or rotator cuff tear rehabilitation. When to introduce: impingement-free arc of motion; pain-free with all earlier stages of strengthening; adequate external rotator strength (ER:IR ratio ≥0.6). Progress from seated press with dumbbells → standing barbell press → overhead sport-specific loading.

├— ORTHOPEDIC ASSESSMENT

179. The 'Positive Impingement Test of the Elbow' (lateral epicondyle tenderness with resisted wrist extension) is the clinical test most sensitive for:

A. Medial epicondylitis

B. Lateral epicondylitis (ECRB tendinopathy) — specifically Maudsley's test: resisted EXTENSION of the MIDDLE FINGER with the elbow extended reproduces pain at the lateral epicondyle (more specific than general resisted wrist extension because it specifically loads the ECRB)

C. Radial head fracture

D. Cubital tunnel syndrome

✓ **Answer: B**

💡 **Rationale & Explanation:**

Lateral epicondylitis clinical tests: MILL'S TEST: passive wrist FLEXION with elbow extended + forearm pronated → stretches the ECRB → pain at lateral epicondyle. COZEN'S TEST: patient attempts wrist extension against examiner's resistance (general wrist extension). MAUDSLEY'S TEST (most specific for ECRB): resisted MIDDLE FINGER EXTENSION with the elbow extended — this selectively loads the ECRB (which is the primary wrist extensor active during a middle finger extension task). Positive: pain at lateral epicondyle. Sensitivity ~50-70%, Specificity ~70-87% for lateral epicondylitis. The reason Maudsley's test is more specific for ECRB: the ECRB must contract strongly to stabilize the wrist during isolated middle finger extension (unlike the extensor digitorum communis which primarily extends the fingers). Clinical cluster for highest accuracy: Maudsley's + palpation of ECRB origin (just anterior and distal to the lateral epicondyle) + history of repetitive wrist extension/gripping.

ORTHOPEDIC REHABILITATION

180. The recommended INITIAL orthotic approach for plantar fasciitis is:

A. Custom total contact casting

B. PRE-FABRICATED HEEL CUP OR ARCH SUPPORT (over-the-counter, $10-30) combined with stretching — equal effectiveness to expensive custom orthotics for most plantar fasciitis patients in the short-to-medium term; custom orthotics reserved for those who do not respond to pre-fabricated options

C. Custom orthotics always immediately

D. No orthotics — stretching only

✓ Answer: B

💡 Rationale & Explanation:

Plantar fasciitis orthotics evidence: Multiple RCTs (including landmark trial by Pfeffer et al., 1999) show that PRE-FABRICATED orthotics (prefab insoles, heel cups, OTC arch supports) combined with stretching are as effective as CUSTOM orthotics for typical plantar

fasciitis at 3-month follow-up. This has major cost implications: custom orthotics can cost $300-600 (USD) vs. prefab options at $10-30. CURRENT RECOMMENDATION (NICE, JOSPT guidelines): start with prefab orthotics + stretching program; reserve custom orthotics for: patients with significant biomechanical abnormalities (severe pes planus/cavus requiring precise correction), failed response to prefab orthotics after 8-12 weeks, occupational requirements. COMBINED TREATMENT: the most effective combination for plantar fasciitis: calf stretching + plantar fascia-specific stretch + prefab orthotic + activity modification ± night splint = resolves symptoms in ~80% of patients within 12 months.

├— ORTHOPEDIC ASSESSMENT

181. The 'posterior apprehension test' for the shoulder (posterior instability) is performed by:

A. Anteriorly forcing the humeral head

B. Applying a POSTERIOR FORCE to the humerus with the arm at 90° forward flexion and INTERNAL ROTATION — the patient becomes apprehensive or the humeral head subluxes posteriorly

C. Extending the arm behind the body

D. Maximally abducting the arm

✓ Answer: B

💡 Rationale & Explanation:

Posterior shoulder apprehension test: TECHNIQUE: patient supine, arm at 90° forward flexion, elbow at 90°. Examiner applies gentle POSTERIOR DIRECTED FORCE along the long axis of the humerus (pushing the humeral head posteriorly in the glenoid) while maintaining 90° flexion + IR. POSITIVE: patient shows apprehension (guards, grabs the examiner's arm, expresses fear of dislocation); or actual posterior subluxation is felt. The JERK TEST (related): arm 90° flex + IR, examiner applies axial compression while horizontally adducting → a palpable clunk as the posterior capsule subluxes.

POSTERIOR INSTABILITY occurs in: posterior capsule laxity (swimmers, throwing athletes from posterior traction during deceleration), posterior Bankart lesion (posterior labral tear — less common than anterior), voluntary posterior instability (multidirectional). Posterior instability rehabilitation: posterior rotator cuff strengthening (infraspinatus, teres minor), posterior capsule stabilization — avoid posterior capsule stretching (sleeper stretch) in posterior instability.

├— ORTHOPEDIC REHABILITATION

182. The 'postural correction exercise' for forward head posture includes:

A. Cervical extension only

B. DEEP CERVICAL FLEXOR ACTIVATION (longus colli and capitis — tested with craniocervical flexion test/CCFT), THORACIC EXTENSION MOBILIZATION AND STRENGTHENING, and SCAPULAR RETRACTION (lower and middle trapezius) — targeting the 'upper crossed syndrome' pattern

C. Pectoral strengthening

D. Upper trapezius stretching only

✓ Answer: B

💡 **Rationale & Explanation:**

Upper crossed syndrome correction exercises: JANDA'S UPPER CROSSED SYNDROME: TIGHT = upper trapezius + levator scapulae (shorten with poor posture) + pectoralis major/minor (tight from rounded shoulders). WEAK = deep cervical flexors (longus colli/capitis) + lower/middle trapezius + serratus anterior. EXERCISE CORRECTION: 1) DEEP CERVICAL FLEXOR TRAINING: craniocervical flexion test (CCFT) → staged activation starting at lowest level (22 mmHg); chin tuck exercise (not neck flexion, but axial retraction targeting longus colli); 2) THORACIC MOBILIZATION AND EXTENSION: thoracic extension over foam roller; thoracic spine mobilization (facet joints often stiff in kyphosis); 3) SCAPULAR RETRACTION STRENGTHENING: middle/lower trapezius (prone T and Y exercises, seated rows); 4) PECTORAL

STRETCHING: doorway stretch. Combined: addressing ALL four components simultaneously produces better outcomes than any single element alone.

├— ORTHOPEDIC ASSESSMENT

183. The 'Yeoman's test' for sacroiliac joint assessment is performed with:

A. Patient sitting

B. Patient PRONE — examiner extends the patient's hip passively (hyperextension) while stabilizing the pelvis; POSITIVE when this produces posterior SIJ or buttock pain — the hip extension stresses the SIJ anteriorly

C. Patient standing on one leg

D. Patient supine with FABER

✓ Answer: B

💡 **Rationale & Explanation:**

Yeoman's test: PATIENT PRONE. Examiner: 1) Stabilizes the pelvis with one hand on the posterior iliac crest/sacrum; 2) Lifts the patient's leg into PASSIVE HIP EXTENSION with the other hand (lifting from the thigh). POSITIVE: pain in the SACROILIAC REGION or buttock. Mechanism: hip extension creates an anterior rotation force on the ilium relative to the sacrum → stresses the anterior sacroiliac ligaments and posterior SIJ structures. The yeoman's test is less commonly used than the 5-test Laslett cluster but is part of some clinical assessment protocols. It overlaps with Thomas test positioning (prone hip extension) but focuses on posterior SIJ pain rather than hip flexor flexibility. The prone hip extension position also loads the lumbar facets — if facet pain is suspected, a positive Yeoman's test is ambiguous (could be SIJ or lumbar facet). Correlation with other SIJ tests improves specificity.

├— ORTHOPEDIC REHABILITATION

184. The 'graded exposure therapy' for CRPS (Complex Regional Pain Syndrome) PHASE 1 begins with:

A. High-intensity graded exercise

B. LEFT-RIGHT LIMB RECOGNITION (implicit motor imagery) — patients identify whether images of limbs on a screen are LEFT or RIGHT; this activates the premotor cortex without activating the fear-pain cycle; normalizes the cortical representation before moving to explicit imagery

C. Aggressive joint mobilization

D. Passive ROM only

✓ Answer: B

💡 **Rationale & Explanation:**

Graded Motor Imagery Phase 1 for CRPS: CLINICAL RATIONALE: CRPS involves cortical reorganization and central sensitization — the brain's representation of the affected limb becomes distorted. Starting with EXPLICIT movement (actual or imagined) immediately may provoke pain flares. LEFT-RIGHT RECOGNITION: viewing photographs of hands/feet and deciding if they are left or right activates the PREMOTOR CORTEX implicitly (without consciously imagining moving the limb). Response time and accuracy in left-right recognition is typically SLOWER and LESS ACCURATE for the affected limb side in CRPS patients — indicating cortical disorganization. NORMALIZING left-right recognition (using the Recognise app) trains the cortical representation WITHOUT triggering the pain system. PROGRESSION criteria: patient can recognize limbs at >80% accuracy AND response time is symmetrical between sides → PROGRESS to Phase 2 (explicit motor imagery). This staged, careful approach prevents the pain flares that result from premature motor activation in CRPS.

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185. The 'sit-to-stand exercise' (chair stands) is used in geriatric rehabilitation primarily to improve:

A. Only back flexibility

B. LOWER EXTREMITY STRENGTH (particularly quadriceps eccentric-concentric), DYNAMIC BALANCE, FUNCTIONAL MOBILITY, and FALL PREVENTION — the 30-second chair stand test quantifies this capacity (normal for 70-year-old: ≥12 stands/30 seconds)

C. Upper extremity strength

D. Cardiovascular endurance only

✓ Answer: B

💡 **Rationale & Explanation:**

Sit-to-stand (STS) exercise in geriatric PT: STS is one of the most FUNCTIONALLY MEANINGFUL exercises in older adults — required for: getting off a toilet, rising from a chair, car transfers, all standing activities. BIOMECHANICS: requires: eccentric quad control on lowering; concentric quad power for rising; hip extensor contribution; trunk extension (no trunk flexion = more hip and quad challenge); balance throughout. 30-SECOND CHAIR STAND TEST (Rikli & Jones): counts number of complete stands in 30 seconds without arms. Norms: men 60-64: ≥16; women 60-64: ≥15; men 70-74: ≥14; women 70-74: ≥13. Below norm = fall risk and functional limitation. MCID: ≥2 additional stands. EXERCISE PRESCRIPTION: start with arms allowed → progress to arms crossed → add a weighted vest; start with raised chair (less knee flexion required) → lower to standard height → eventually chair-free squats. STS is both an assessment AND a highly functional exercise.

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186. The 'PNF diagonal patterns' (D1 and D2 flexion/extension) are used because:

A. They isolate single muscle groups

B. They COMBINE MULTIPLE PLANES OF MOTION simultaneously (sagittal + frontal + transverse), closely mimicking FUNCTIONAL MOVEMENT PATTERNS — D1 and D2 diagonals are identified in virtually all sports and daily activities

C. They are purely isometric

D. They only train the upper extremity

✓ **Answer: B**

💡 **Rationale & Explanation:**

PNF diagonal patterns: Kabat, Knott, and Voss developed these from the observation that normal human movement occurs in SPIRALING DIAGONAL PATTERNS rather than pure cardinal plane movements. D1 FLEXION (UE): shoulder flex + horizontal ADD + ER; elbow flex; forearm supination; wrist + finger flex (similar to combing the hair or blocking a punch). D1 EXTENSION: shoulder ext + horizontal ABD + IR; elbow ext; forearm pronation; wrist + finger ext. D2 FLEXION: shoulder flex + horizontal ABD + ER; forearm supination; wrist ext (like drawing a sword). D2 EXTENSION: shoulder ext + ADD + IR; wrist flex (returning the sword to the scabbard). The patterns INTEGRATE multiple muscle groups synergistically. In rehabilitation: patients practice patterns that are relevant to their functional goals (e.g., a baseball pitcher needs shoulder D2 extension in follow-through). PNF diagonal patterns are particularly useful in neurological rehabilitation (Brunnstrom synergy → diagonal movement progression).

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187. The 'aquatic treadmill' is used in rehabilitation because:

A. It only benefits cardiovascular fitness

B. The COMBINATION OF WATER BUOYANCY (reduces weight-bearing by 60-90%), HYDRODYNAMIC RESISTANCE, and TREADMILL SPEED CONTROL allows GAIT TRAINING at reduced body weight loading — effective for: post-surgical patients needing early ambulation, arthritis patients, and obese individuals

C. It is only for elite athletes

D. It provides no proprioceptive input

✓ **Answer: B**

💡 **Rationale & Explanation:**

Aquatic treadmill therapy: combines water immersion benefits with a moving tread surface. The patient walks on an underwater treadmill while the water level is adjusted to provide the desired level of weight reduction: HIP-LEVEL WATER: ~40-50% weight reduction; WAIST-LEVEL: ~50% reduction; CHEST-LEVEL: ~60-70% reduction; SHOULDER-LEVEL:

~75-80% reduction. SPEED CONTROL allows progressive loading without terrain variability concerns. WATER RESISTANCE provides gentle proprioceptive input and adds resistance for strengthening. CLINICAL APPLICATIONS: post-TKA/THA (early ambulation with reduced joint loading); knee/hip OA (exercise at lower loads reduces pain); post-ACL reconstruction (early gait training in the protected loading phase); morbid obesity (land-based gait is impossible or painful); neurological gait retraining (incomplete SCI, stroke); post-fracture (protected ambulation before full weight-bearing is cleared). The aquatic treadmill enables EARLIER AMBULATION than traditional land-based protocols.

ORTHOPEDIC ASSESSMENT

188. The 'Neer's impingement injection test' confirms the diagnosis of subacromial impingement by:

A. Reproducing pain with injection

B. RESOLVING PAIN with a subacromial corticosteroid injection — if the Neer sign is positive (painful arc) and the pain is completely resolved by an injection into the subacromial space, this confirms the SUBACROMIAL SPACE as the source of pain (distinguishing from AC joint or GHJ pathology)

C. Always requiring surgery after

D. Causing immediate strength improvement

✓ Answer: B

💡 Rationale & Explanation:

Neer's impingement injection test: TECHNIQUE: inject 10 mL of local anesthetic (lidocaine) into the subacromial bursa. Repeat the Neer impingement sign. POSITIVE INJECTION TEST: pain is completely eliminated = confirms the SUBACROMIAL BURSA/SPACE as the pain source. NEGATIVE INJECTION TEST: pain persists after injection = pain originates from elsewhere (GHJ, ACL joint, cervical spine) — the subacromial space is NOT the primary pain generator. Clinical utility:

when imaging and clinical examination are inconclusive; before planning subacromial decompression surgery (if pain doesn't resolve with injection, surgery targeting the subacromial space may not help); distinguishing multiple potential pain sources in a complex shoulder presentation. For PT: understanding the injection test helps interpret the clinical picture when a patient reports complete relief from a steroid injection — confirming subacromial pathology and guiding PT intervention focus.

├─ ORTHOPEDIC REHABILITATION

189. A patient presents 6 weeks post-distal radius fracture, now out of cast. The FIRST priority in PT is:

A. Strengthening the wrist flexors

B. RESTORING WRIST AND FOREARM ROM (especially pronation/supination and wrist extension) — the first few sessions focus on gentle ROM, edema control, and active-assisted exercises; strengthening begins after adequate ROM is restored

C. Returning to sport immediately

D. Ignoring pain and forcing movement

✓ Answer: B

💡 Rationale & Explanation:

Post-cast distal radius fracture rehabilitation sequence: IMMEDIATE POST-CAST PRIORITIES: 1) ROM: wrist and forearm motion (pronation/supination often the most restricted — involve the DRUJ); 2) EDEMA: retrograde massage, elevation, compression sleeve; 3) PAIN MANAGEMENT: ice, gentle movement, pacing. PROGRESSIVE SEQUENCE: Weeks 6-8: gentle active and active-assisted ROM in all planes; finger tendon gliding; edema management; 8-10 weeks: progressive wrist strengthening (isometrics → isotonics through range); begin grip strengthening; 10-12 weeks: functional strengthening; ADL retraining; wrist and forearm loading; 3-6 months: return to sport or heavy occupational demands. KEY CLINICAL POINTS:

Pronation/supination limitation is the most functionally disabling ROM restriction — prioritize it early; CRPS Type 1 is a significant complication (watch for disproportionate pain, allodynia, autonomic changes); PRWE outcome measures document recovery; patient education about expected recovery timeline (12-18+ months for full function after complex fractures).

├— ORTHOPEDIC ASSESSMENT

190. The 'cluster of tests' approach for diagnosis is preferred over single special tests because:

A. Single tests are always accurate

B. MULTIPLE TESTS with complementary sensitivity/specificity characteristics create a 'CLINICAL PREDICTION RULE' with significantly higher diagnostic accuracy than any individual test — a cluster of 3+ positive tests for a condition greatly increases post-test probability

C. Single tests are cheaper

D. Clusters are only used for research

✓ Answer: B

💡 Rationale & Explanation:

Diagnostic cluster approach in musculoskeletal PT: SINGLE TESTS: almost never have both high sensitivity AND high specificity. But combining: HIGH-SENSITIVITY test (positive = rules IN): catches most true positives. HIGH-SPECIFICITY test (negative = rules OUT): eliminates most false positives. EXAMPLE — SIJ cluster (Laslett 5 tests): distraction, FABER, thigh thrust, compression, Gaenslen's. Any single test: ~50-70% sensitivity and specificity. 3+ tests positive: sensitivity ~91%, specificity ~87% for SIJ pain. EXAMPLE — Cervical radiculopathy cluster (Wainner): Spurling's + distraction + ULTT-A + ipsilateral cervical rotation <60°. All 4 positive: LR+ = 30.3 → nearly diagnostic. PHILIPPINE PT BOARD RELEVANCE: questions asking about 'which test is MOST diagnostic' often test knowledge of diagnostic clusters and

that single tests rarely provide definitive diagnosis. Applying the cluster approach reflects advanced clinical reasoning.

ORTHOPEDIC REHABILITATION

191. The 'hip thrust exercise' (barbell hip thrust, glute bridge) specifically loads which muscle with high EMG activation?

A. Quadriceps

B. GLUTEUS MAXIMUS — hip thrust produces the HIGHEST EMG activation of the gluteus maximus among all exercises (greater than squats, deadlifts, lunges); particularly activates the upper and lower gluteus maximus through its FULL RANGE including terminal hip extension

C. Hamstrings only

D. Tibialis anterior

✓ Answer: B

💡 **Rationale & Explanation:**

Hip thrust biomechanics: the BARBELL HIP THRUST (Brett Contreras et al.) and GLUTE BRIDGE are performed with the upper back resting on a bench, knees bent, feet flat. As the hips are driven upward (hip extension), the gluteus maximus activates through a nearly complete range of hip extension. EMG STUDIES: hip thrust produces ~80-100% MVC (maximum voluntary contraction) of the glute max — higher than squats (50-60% MVC), deadlifts (70-80% MVC), or lunges (60-70% MVC). Why higher activation? The HORIZONTAL FORCE VECTOR against the barbell across the pelvis creates a moment that demands maximum hip extension torque through the full range, particularly in terminal extension where squats are weakest for glute activation. REHABILITATION APPLICATIONS: gluteal amnesia (inhibited glutes post-LBP surgery), hip OA rehab, PFPS (restoring hip-knee-ankle kinetic chain), return to sport after hamstring strain (hip thrust is safe as it loads the glute without excessive hamstring stress), GTPS rehabilitation (glute strengthening).

ORTHOPEDIC ASSESSMENT

192. The 'Impingement classification of Neer' describes shoulder impingement in THREE stages. Stage III involves:

A. Impingement without structural damage

B. Complete ROTATOR CUFF TEAR and sometimes biceps tendon pathology — the end-stage of the impingement-degeneration process that began with edema and hemorrhage (Stage I), progressed to fibrosis and tendinosis (Stage II), and culminated in full-thickness tear (Stage III)

C. Calcific tendinitis only

D. AC joint pathology

✓ Answer: B

💡 Rationale & Explanation:

Neer's three-stage impingement classification (1983): STAGE I (age <25): reversible EDEMA AND HEMORRHAGE of the supraspinatus tendon from impingement — common in young overhead athletes; responds well to conservative treatment (activity modification, PT). STAGE II (age 25-40): progressive FIBROSIS AND THICKENING of the supraspinatus tendon (irreversible tendinopathy/fibrosis); recurrent pain with overhead activity; conservative treatment still beneficial but less completely effective; surgical decompression occasionally needed. STAGE III (age >40): PARTIAL OR COMPLETE ROTATOR CUFF TEAR; the end-stage of the impingement process; surgical repair often needed for full-thickness tears in active patients. This classification helps PREDICT natural history and GUIDE treatment intensity: Stage I = aggressive conservative management, excellent prognosis; Stage II = conservative then surgical if needed; Stage III = surgical evaluation for repair vs. conservative management based on patient age, activity level, and tear characteristics.

ORTHOPEDIC REHABILITATION

193. The 'Nordic hamstring curl' training program should be INTRODUCED progressively because:

A. The exercise is too easy initially

B. DELAYED ONSET MUSCLE SORENESS (DOMS) is severe with first exposures — introducing too many repetitions immediately causes significant soreness that interferes with training for 5-7 days; the proper introduction protocol starts with ONLY 2-3 reps per session in week 1, gradually building to 3×10 by week 9

C. It is contraindicated in athletes

D. Athletes prefer not to do it

✓ Answer: B

💡 **Rationale & Explanation:**

Nordic hamstring curl introduction protocol (EVIDENCE-BASED): the NHC produces high eccentric hamstring forces → significant DOMS in unaccustomed athletes → if done at full dosage from week 1, the resulting soreness prevents normal training for a week or more. PROPER INTRODUCTION SCHEDULE (Mjolsnes et al.): Week 1-2: 2 sets × 5 reps. Week 3-4: 3 × 6-8. Week 5-8: 3 × 8-10. Week 9-10: 3 × 10-12. Week 11-12: 3 × 10-12 (maintenance). ONCE THE ATHLETE IS ADAPTED (8-10 weeks): transition to maintenance (1 session/week) — frequency can be reduced from 3×/week. This progressive introduction is ESSENTIAL for athlete compliance and avoiding the complete rejection of the exercise due to severe post-exercise soreness in week 1. ADDITIONAL CUES: keep the amortization phase as short as possible (hands catch and immediately push back); focus on the eccentric lowering phase rather than the concentric return.

ORTHOPEDIC ASSESSMENT

194. In lumbar spine assessment, the 'Hip-Spine Clinic' concept (from Offierski and MacNab) addresses:

A. Back pain only

B. The FREQUENT CO-EXISTENCE of hip and lumbar spine pathology — in some patients, symptoms from BOTH sources are present simultaneously, making it challenging to determine the primary pain generator; specific tests help determine how much of the patient's symptoms come from the hip vs. the spine

C. Shoulder and spine co-pathology

D. Ankle and spine relationship

✓ Answer: B

💡 **Rationale & Explanation:**

Hip-spine syndrome: a significant diagnostic challenge in musculoskeletal PT. SYMPTOMS FROM BOTH: a patient may have hip OA AND lumbar spinal stenosis simultaneously, each contributing to their disability. CLINICAL CLUES pointing to HIP as primary source: groin pain; pain reproduction with FADIR; pain with weight-bearing activities (walking, stairs) relieved by sitting; restricted hip ROM; normal/near-normal lumbar spine ROM; hip X-ray showing OA. CLUES pointing to SPINE as primary source: radiating pain into buttock/posterior thigh beyond the hip; SLR positive; neurogenic claudication (worse with walking, better with sitting/flexion); normal hip ROM; lumbar X-ray/MRI showing pathology. DIAGNOSTIC INJECTION: local anesthetic injected into the hip joint that relieves >50% of symptoms = hip is the primary source. This guides surgical planning: do not operate on the spine if the hip is the primary generator (may not relieve pain). PT must assess both regions in every LBP and hip patient.

ORTHOPEDIC REHABILITATION

195. 'Instrument-Assisted Soft Tissue Mobilization' (IASTM) treatment for Achilles tendinopathy should target:

A. The Achilles tendon itself only

B. THE TENDON AND PERITENDINOUS SOFT TISSUE STRUCTURES — applying IASTM along the entire length of the Achilles tendon, Achilles insertion, and plantarflexor muscle belly; followed by ECCENTRIC CALF RAISES while the tissue is warmed and more extensible

C. The calcaneal bone

D. The plantar fascia only

✓ Answer: B

💡 **Rationale & Explanation:**

IASTM for Achilles tendinopathy: the therapeutic sequence: 1) IASTM APPLICATION: use the appropriate instrument (Graston Tool 6, HawkGrip, ASTYM instrument); apply along the ENTIRE ACHILLES TENDON (from myotendinous junction to calcaneal insertion) and into the gastrocnemius-soleus muscle belly; purpose: create controlled microtrauma → stimulate fibroblast activity → promote collagen remodeling; identify restricted or fibrotic areas by feel (gritty texture, increased tissue resistance) and patient report (site-specific tenderness); 2) IMMEDIATE STRETCHING: while tissue is 'opened up' from IASTM, apply calf stretches (sustained 30-60 second holds); 3) ECCENTRIC LOADING: perform eccentric calf raises while tissue is in the post-IASTM state (increased extensibility and blood flow); 4) HOME PROGRAM: eccentric heel drops twice daily. FREQUENCY: 1-2 sessions/week for 4-6 weeks. PRECAUTIONS: avoid directly over acute tears, open wounds, severely inflamed tendon (use pulsed US instead).

├— ORTHOPEDIC ASSESSMENT

196. The 'stress fracture risk assessment' in athletes considers which factors:

A. Running speed only

B. TRAINING LOAD (sudden increase in volume/intensity), BONE HEALTH (low BMD, RED-S, female athlete triad, vitamin D deficiency),

BIOMECHANICS (excessive pronation, hip abductor weakness), and FOOTWEAR — low risk athletes need education only; high-risk need imaging

C. Gender only

D. Fatigue level only

✓ Answer: B

💡 **Rationale & Explanation:**

Stress fracture risk stratification: HIGH-RISK SITES (require activity modification + imaging): femoral neck (anterior), sacrum, tarsal navicular, 5th metatarsal diaphysis (Jones fracture), sesamoids, medial malleolus. These high-risk sites have: poor blood supply and/or high mechanical stress → potential for complete fracture and delayed healing. LOWER-RISK SITES: tibia shaft, fibula, metatarsal shafts 2-4 — these heal well with relative rest. RISK FACTORS: female sex + low energy availability (RED-S/Female Athlete Triad) = highest overall risk; sudden increase in training (50%+ weekly increase); hard training surfaces; worn-out footwear; previous stress fracture; narrow tibial width; amenorrhea. CLINICAL SIGNS: point tenderness over the bone (not diffuse); pain with weight-bearing; tuning fork test (vibration applied to the bone → pain in the area of suspicion); hop test positive. IMAGING: X-ray often negative for 2-3 weeks; MRI is GOLD STANDARD (shows marrow edema before X-ray changes). PT role: identify risk factors, modify training loads, address biomechanics, ensure nutritional support.

ORTHOPEDIC REHABILITATION

197. The 'hip-first approach' to patellofemoral pain syndrome treatment is supported by evidence because:

A. Hip exercises cure all PFPS without knee exercises

B. HIP ABDUCTOR AND EXTERNAL ROTATOR STRENGTHENING reduces DYNAMIC KNEE VALGUS during activities — controlling the proximal cause of patellar maltracking; Level 1a evidence (multiple systematic

reviews) confirms hip strengthening produces superior outcomes to quadriceps-only rehabilitation for PFPS

C. The hip and knee are unrelated

D. Knee exercises are contraindicated in PFPS

✓ Answer: B

💡 **Rationale & Explanation:**

Hip strengthening evidence for PFPS: LANDMARK STUDY: Nakagawa et al. (2008), Dolak et al. (2011), and subsequent systematic reviews confirmed: hip-focused strengthening produces GREATER and FASTER pain reduction than quad-focused programs for PFPS. The neurological mechanism: HIP ER + ABD STRENGTHENING → improved motor control of femoral rotation and adduction → reduced dynamic knee valgus → reduced lateral patellar stress. CLINICAL PROGRAM: hip abductors (clamshells, sidelying abduction, standing hip hikes, lateral band walks) + hip external rotators (sidelying ER with knee flexed, standing ER against band, single-leg squat with hip rotation control) + FUNCTIONAL MOVEMENT TRAINING (step-downs with hip control focus). KEY INSIGHT: even if the pain is AT the knee, the CAUSE may be PROXIMAL (hip weakness) — effective treatment targets the source, not just the symptom. This is a classic example of treating the cause rather than the location of pain.

ORTHOPEDIC ASSESSMENT

198. The 'STAR EXCURSION BALANCE TEST' in the POSTEROMEDIAL direction is most sensitive for:

A. Shoulder injuries

B. LOWER EXTREMITY INJURY RISK — posteromedial reach distance < 4 SD below the normative value for the athlete's body proportions OR >4 cm asymmetry between sides = significantly increased ACL, ankle sprain, and overall LE injury risk

C. Upper limb balance

D. Cognitive dual-task performance

✓ **Answer: B**

💡 **Rationale & Explanation:**

SEBT posteromedial direction significance: Research (Plisky et al., 2006) found that high school basketball players with posteromedial SEBT reach distance <70% of limb length had 6.5× greater odds of sustaining an ankle injury. Multiple studies confirm posteromedial direction is the MOST PREDICTIVE direction for LE injury in the SEBT/Y-Balance test. WHY posteromedial? This direction requires: single-leg balance; adequate hip extension + abduction strength; eccentric loading of the hamstrings and gluteals; complex neuromuscular coordination. Deficits in all these dimensions predict LE injury. ACL RECONSTRUCTION RETURN TO SPORT: Y-Balance test LSI ≥90% in all three directions (anterior, posteromedial, posterolateral) is one of the criteria in comprehensive return-to-sport testing batteries. Rehabilitation targeting the specific neuromuscular deficits identified on SEBT/Y-Balance testing creates targeted, efficient training programs.

├─ ORTHOPEDIC REHABILITATION

199. The 'modified Pilates' approach in rehabilitation emphasizes:

A. High-impact aerobic exercise

B. CORE STABILITY, NEUTRAL SPINE CONTROL, BREATHING COORDINATION, AND PRECISE MOVEMENT QUALITY — focusing on activating the deep stabilizers (TrA, multifidus, pelvic floor) while performing controlled limb movements; evidence supports its use for LBP and pelvic floor dysfunction

C. Pure flexibility training

D. Only stretching the spine

✓ **Answer: B**

💡 **Rationale & Explanation:**

Pilates in rehabilitation context: Clinical Pilates (Modified Pilates for Rehabilitation): adapts classical Pilates for patients with musculoskeletal and neurological conditions. CORE PRINCIPLES: 1) CONCENTRATION: focused attention on the specific muscle being activated; 2) CENTERING: activation of the 'powerhouse' (TrA + multifidus + pelvic floor + diaphragm) before and during all movements; 3) CONTROL: precise, controlled movement quality over speed or weight; 4) BREATHING: coordinating breath with movement; 5) PRECISION: correct form over quantity; 6) FLOW: movement should be smooth and flowing. REHABILITATION EVIDENCE: moderate-strong for CHRONIC LBP (comparable to other forms of exercise but may be superior for adherence due to patient enjoyment); pelvic floor dysfunction (connection between TrA activation and pelvic floor co-activation); scoliosis exercises (Pilates-based programs reduce progression and improve posture in mild-moderate scoliosis). PT training: Pilates instructor certification is not equivalent to clinical Pilates rehabilitation training — PTs should complete a recognized Clinical Pilates Rehabilitation program.

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200. In the PHILIPPINES, the typical PT referral pathway for a patient with acute LBP from a general practitioner (GP) is:

A. Emergency surgery

B. GP → PT direct referral (in many hospital systems) OR GP → specialist (ortho/neuro) → PT; with growing primary-contact PT models, patients may also SELF-REFER to PT in some settings — however, the current standard in Philippine hospitals requires a medical referral slip for PT services

C. No referral needed anywhere

D. Only tertiary hospital PT services

✓ Answer: B

💡 **Rationale & Explanation:**

Philippine PT referral system: TRADITIONAL MODEL (most Philippine government and private hospitals): 1) Patient sees a GENERAL PRACTITIONER or SPECIALIST; 2) Doctor issues a REFERRAL SLIP with

the medical diagnosis and treatment request ('Please provide PT'); 3) Patient presents the referral slip to the PT department; 4) PT performs evaluation and initiates treatment. CURRENT TRENDS: PhilHealth-accredited PT clinics accepting direct referrals; some private outpatient PT clinics operate on a self-referral or direct access model; occupational health settings (PT screening without physician referral); sports medicine settings (PT as first contact). WORLD PHYSIOTHERAPY POSITION: advocates for DIRECT ACCESS TO PT globally — evidence shows direct PT access produces equivalent outcomes to GP-first pathways for musculoskeletal conditions, and at lower cost. Philippine PT advocacy: PAPT continues to advocate for legislative recognition of direct PT access in the Philippines, aligned with global trends and evidence. For current board examination: know the traditional referral system AND the evolving landscape.

ORTHOPEDIC ASSESSMENT

201. The 'Speed's test' is specific for:

A. AC joint pathology

B. Bicipital tendinitis and SLAP lesions — resisted shoulder forward flexion at 90° with elbow extended and forearm supinated; positive when pain is reproduced at the bicipital groove or deep in the shoulder

C. Rotator cuff impingement

D. Subacromial bursitis

✓ Answer: B

💡 Rationale & Explanation:

Speed's test: arm at 90° flexion, elbow extended, forearm SUPINATED. Apply downward resistance. POSITIVE: pain at the BICIPITAL GROOVE (bicipital tendinitis) or DEEP IN THE SHOULDER (SLAP lesion). Sensitivity ~48-69%, specificity ~55-67%. Speed's test specifically loads the long head of the biceps tendon in the groove. Combined Speed's +

O'Brien's + Yergason's = better diagnostic accuracy cluster for biceps/SLAP pathology than any single test.

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202. Craig's test measures:

A. Hip abductor strength

B. Femoral anteversion — patient prone, knee 90°; rotate hip internally until the greater trochanter is most prominent laterally; measure the lower leg angle from vertical = anteversion angle

C. Piriformis length

D. IT band tightness

✓ Answer: B

💡 **Rationale & Explanation:**

Craig's test (Ryder test): patient PRONE, knee 90°. Examiner palpates the greater trochanter; rotates hip internally until the trochanter is maximally prominent laterally (femoral neck horizontal). Angle of lower leg from vertical = femoral anteversion. Normal: 8-15° adults; children 15-20°. >20° = increased anteversion (in-toeing, increased knee valgus risk, PFPS susceptibility). <8° or negative = retroversion (out-toeing, hip impingement susceptibility).

├— MANUAL THERAPY

203. The 'Australian approach' to spinal manual therapy emphasizes:

A. Only HVLAT techniques

B. Clinical assessment-based technique selection with continuous reassessment after each intervention — the patient's response guides all decisions

C. Only Grade I techniques

D. Only passive treatments

✓ Answer: B

💡 **Rationale & Explanation:**

Australian approach (Maitland framework): 1) COMPREHENSIVE EXAMINATION; 2) HYPOTHESIS-DRIVEN treatment; 3) CONTINUOUS REASSESSMENT after every technique (did it help? — the 'brick wall' concept); 4) GRADES applied based on patient response (I-II for pain, III-IV for stiffness); 5) Patient-centered. The approach emphasizes that the right technique for the wrong diagnosis produces poor results. Both Maitland oscillatory and Kaltenborn sustained techniques are integrated based on clinical reasoning.

ORTHOPEDIC REHABILITATION

204. The 'Interval Throwing Program' (ITP) for returning overhead athletes begins:

A. At full pitching distance immediately

B. With short-distance flat-ground throwing at partial effort, progressively increasing distance and intensity over weeks to months

C. With plyometrics only

D. Surgery first

✓ Answer: B

💡 Rationale & Explanation:

ITP (James Andrews): FLAT GROUND PHASE: 45 feet, 50% effort, 25 throws → progressive increases to 120 feet. MOUND PHASE: starts at 45 feet off mound → full regulation distance (60'6'') → fastballs first, then breaking balls. RETURN TO COMPETITION: bullpen sessions → simulated games → game appearances. CRITERIA TO PROGRESS: pain-free at current level, adequate velocity and mechanics. Prevents re-injury by ensuring gradual tissue adaptation to throwing-specific demands.

ORTHOPEDIC ASSESSMENT

205. The 'Elbow flexion test' assesses:

A. Lateral epicondylitis

B. Cubital tunnel syndrome — maximally flex the elbow for 60-90 seconds; positive when numbness/tingling appears in the ring and little fingers (ulnar nerve distribution)

C. Biceps integrity

D. Olecranon bursitis

✓ Answer: B

💡 **Rationale & Explanation:**

Elbow flexion test: maximum elbow flexion for 60-90 seconds. POSITIVE: ulnar nerve distribution symptoms (little and ring fingers, medial forearm). Mechanism: maximum flexion stretches the ulnar nerve over the medial epicondyle AND reduces cubital tunnel volume → increases pressure on the sensitized nerve. Sensitivity ~32-75%, Specificity ~99% in some studies. Combine with Tinel's at the medial elbow for better accuracy.

├— ORTHOPEDIC REHABILITATION

206. Eccentric Achilles training is prescribed twice daily because:

A. Convenience

B. Twice-daily loading provides adequate mechanical stimulus for collagen synthesis and remodeling — the collagen synthesis cycle benefits from twice-daily mechanical loading; Alfredson's original protocol and subsequent research confirms twice-daily produces superior outcomes

C. Once daily is equally effective

D. Three times daily is standard

✓ Answer: B

💡 **Rationale & Explanation:**

Alfredson protocol rationale: twice-daily (morning and evening) provides 1) twice-daily mechanical stimulus for collagen synthesis; 2) adequate 8-12 hour recovery between sessions. Research confirms twice-daily superior to once-daily. Heavy Slow Resistance studies use less frequent protocols (3 days/week) with heavier loads and longer recovery — comparable outcomes with better compliance for working patients.

ORTHOPEDIC ASSESSMENT

207. The 'squeeze test' for ankle syndesmosis:

A. Squeezes the calcaneus

B. Compresses the fibula and tibia together at mid-shaft level — positive when this produces pain at the distal ankle syndesmosis, indicating high ankle sprain

C. Squeezes the Achilles tendon

D. Tests metatarsal stress fractures

✓ Answer: B

💡 Rationale & Explanation:

Syndesmosis squeeze test: compress FIBULA and TIBIA at MID-SHAFT (15-20 cm above ankle). POSITIVE: pain at the ANTERIOR DISTAL SYNDESMOSIS. Sensitivity ~30% (poor alone), Specificity ~93% (high). High ankle sprain: mechanism = external rotation + ankle DF (cleat catching in turf); more severe, longer recovery (6-12 weeks vs. 1-6 weeks for lateral sprain); check for diastasis on X-ray.

ORTHOPEDIC REHABILITATION

208. Kinesio taping for lymphedema uses which specific technique?

A. Muscle facilitation tape

B. LYMPHATIC DECOMPRESSION — fan/octopus pattern with the base at a healthy lymph node region; multiple tails over the edematous area with minimal tension (0-15%); the lifting of skin creates channels for lymphatic flow

C. Standard muscle inhibition

D. Cross-fiber friction

✓ Answer: B

💡 **Rationale & Explanation:**

Lymphedema kinesio taping: BASE = over the nearest functional lymph node (axilla for arm, inguinal for leg). TAILS = 4-6 strips fanning over the edematous region. TENSION = minimal (0-15% stretch) — just enough to adhere; elastic recoil creates SKIN LIFTING that decompresses superficial lymphatics. MECHANISM: lifted skin creates physical space for lymph to flow toward the node. Provides between-session maintenance when compression garment is not worn. Evidence: moderate for post-mastectomy lymphedema when combined with formal CDT.

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209. Mirror therapy for CRPS works by:

A. Physically stretching the affected hand

B. Providing visual feedback of the unaffected hand moving — the brain perceives this as the affected hand moving normally and pain-free, disrupting cortical pain memory and recalibrating cortical body representation

C. Electrical stimulation through the mirror

D. Strengthening via mirror reflection

✓ Answer: B

💡 **Rationale & Explanation:**

Mirror therapy (Ramachandran): SETUP: vertical mirror between the arms; UNAFFECTED hand visible; AFFECTED hand hidden. MECHANISM: 1) Activates mirror neurons — 'seeing' movement activates motor programs for that movement; 2) Disrupts the learned pain memory; 3) Recalibrates cortical body representation — CRPS

causes cortical reorganization; mirror therapy helps restore normal representation. Level 1a evidence for CRPS Type 1 and phantom limb pain. Phase 3 of Graded Motor Imagery (GMI) protocol.

├─ ORTHOPEDIC ASSESSMENT

210. 'Maudsley's test' is MOST specific for:

A. Medial epicondylitis

B. Lateral epicondylitis (ECRB tendinopathy) — resisted MIDDLE FINGER extension with elbow extended reproduces lateral epicondyle pain by specifically loading the ECRB

C. Bicipital tendinitis

D. Pronator syndrome

✓ Answer: B

💡 **Rationale & Explanation:**

Maudsley's test: resisted extension of the MIDDLE FINGER with elbow fully extended. SPECIFICALLY LOADS THE ECRB — which must contract strongly to stabilize the wrist during isolated middle finger extension. Pain at the lateral epicondyle = lateral epicondylitis. More specific than general resisted wrist extension (Cozen's test). Combine with direct ECRB origin palpation (1-2 cm anterior and distal to the lateral epicondyle) for highest diagnostic specificity.

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211. The hip FADIR test is:

A. Different from the hip impingement test

B. THE SAME TEST as the hip anterior impingement test — FADIR (Flexion, ADduction, Internal Rotation) IS the anterior impingement test; high sensitivity (~96%) for FAI/labral tear

C. Lower sensitivity than FABER

D. Only used for hip OA

✓ Answer: B

💡 **Rationale & Explanation:**

FADIR = hip impingement test = anterior impingement test — ALL describe the same maneuver: patient supine, examiner moves hip into 90° FLEXION + ADDUCTION + INTERNAL ROTATION. POSITIVE: anterior groin pain = FAI, labral tear, or synovitis. Sensitivity ~96% (excellent screening — if negative, FAI/labral tear less likely). Specificity ~25% (many false positives — hip OA, psoas impingement). High sensitivity = useful for ruling out; confirm with MRI arthrogram.

ORTHOPEDIC REHABILITATION

212. The CKC advantage for ACL rehabilitation is primarily:

A. Exercises are easier

B. CKC exercises promote CO-CONTRACTION of hamstrings and quadriceps simultaneously, which reduces anterior tibial shear force on the healing ACL graft — the hamstrings act as a dynamic ACL by pulling the tibia posteriorly while quads pull anteriorly

C. They require no equipment

D. They produce more quad strength than OKC

✓ **Answer: B**

💡 **Rationale & Explanation:**

CKC exercises and ACL protection: FOOT FIXED; hamstrings and quads co-contract; hamstrings counteract the anterior tibial translation from quad activation → NET REDUCED ACL GRAFT STRAIN. Additionally: CKC exercises produce COMPRESSIVE FORCES → JOINT STABILITY. OKC terminal knee extension (0-40°): high anterior tibial shear → limited to 90-40° range in early ACL rehab. Progression: CKC first → safe OKC ranges → full OKC → sport-specific.

ORTHOPEDIC ASSESSMENT

213. The 'Wilson test' for OCD of the medial femoral condyle:

A. Tests meniscal pathology

B. Flex knee to 90°, internally rotate tibia, slowly extend — positive when pain occurs at ~30° of extension (tibial spine contacts OCD lesion) that is RELIEVED by external tibial rotation

C. Tests patellar instability

D. Tests valgus instability

✓ Answer: B

💡 **Rationale & Explanation:**

Wilson test for OCD: the classic OCD lesion is on the posterolateral aspect of the medial femoral condyle — contacts the medial tibial spine in terminal extension with internal tibial rotation. POSITIVE: pain at ~30° extension with internal tibial rotation, relieved by external rotation. Sensitivity ~25% (low), reasonable specificity. OCD: adolescent athletes; loose body may cause locking/catching. Stable lesions: conservative (activity restriction, protected WB); Unstable: surgical fixation.

├— ORTHOPEDIC REHABILITATION

214. For lumbar spondylolisthesis Grade I, which intervention is MOST important to AVOID?

A. Core strengthening in neutral

B. Sustained LUMBAR EXTENSION EXERCISES (prone press-ups, McKenzie extension, extension machine) — these increase anterior shear stress at the unstable level, potentially worsening the forward slip

C. Aerobic exercise

D. Isometric abdominal exercises

✓ Answer: B

💡 **Rationale & Explanation:**

Spondylolisthesis and extension: ISTHMIC SPONDYLOLISTHESIS — defect in pars interarticularis → vertebra can slip anteriorly. CONTRAINDICATED: lumbar extension exercises → increase anterior shear at the slip level; heavy axial loading. RECOMMENDED PT: NEUTRAL SPINE STABILIZATION (TrA + multifidus in neutral); aerobic exercise (walking, swimming); activity modification; posture education; stabilization brace for return to sport.

ORTHOPEDIC ASSESSMENT

215. The Thompson test sensitivity and specificity for complete Achilles tendon rupture:

A. 50% sensitivity, 50% specificity

B. Sensitivity >96%, specificity >93% — when positive (no plantarflexion with calf squeeze), it highly reliably confirms complete Achilles tendon rupture

C. 30% sensitivity

D. 99% sensitivity, 50% specificity

✓ Answer: B

💡 **Rationale & Explanation:**

Thompson test diagnostic accuracy: SENSITIVITY >96% — very rarely misses a complete rupture. SPECIFICITY >93% — positive test almost always indicates complete rupture. TECHNIQUE: patient prone, knee slightly bent; examiner SQUEEZES the calf; POSITIVE = no plantarflexion of foot. Partial tears: reduced but present plantarflexion. Management: functional rehabilitation in equinus walking boot vs. surgical repair — comparable outcomes for most patients; surgical preferred for young athletes and re-rupture.

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216. Dial test at 30° ONLY (not 90°) showing >10° ER asymmetry indicates:

A. ACL injury

B. Isolated posterolateral corner (PLC) injury — the PCL is intact (limits ER at 90°) but the PLC structures are disrupted, allowing excessive ER at 30°

C. MCL injury

D. Meniscal tear

✓ Answer: B

💡 **Rationale & Explanation:**

Dial test interpretation: POSITIVE ONLY AT 30° = ISOLATED PLC injury. POSITIVE AT BOTH 30° AND 90° = PLC + PCL combined injury. Clinical: missed PLC injuries lead to persistent posterolateral instability and graft failure after ACL or PCL reconstruction if PLC is not addressed simultaneously. Always compare bilaterally — natural ER asymmetry up to 5° can be normal.

ORTHOPEDIC REHABILITATION

217. 'Pain neuroscience education' (PNE) for chronic pain aims to change:

A. Only medication use

B. The patient's understanding of pain — from biomedical model (pain = tissue damage) to biopsychosocial-neurobiological model (pain = brain output based on threat assessment, not just tissue signals) — changing pain beliefs is associated with improved outcomes

C. Only exercise habits

D. Only posture

✓ Answer: B

💡 **Rationale & Explanation:**

PNE (Moseley and Butler — Explain Pain): CORE MESSAGE: pain is an output of the brain, not just a signal from tissues. The brain produces pain based on threat assessment — not necessarily based on tissue damage. EDUCATIONAL CONTENT: why we have pain; central sensitization; factors that turn pain up (stress, fear, poor sleep) and down (movement, positive emotions, understanding); difference

between hurt and harm. EVIDENCE: systematic reviews show PNE reduces: pain intensity, catastrophizing, kinesiophobia, disability; improves movement and return to work. PNE + graded exercise is superior to either alone for chronic LBP.

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218. GIRD (Glenohumeral Internal Rotation Deficit) in throwing athletes is primarily treated with:

A. Anterior capsule stretching

B. Posterior capsule stretching — sleeper stretch and cross-body stretch — targeting the tight posterior glenohumeral capsule that causes superior and posterior humeral head migration

C. Anterior deltoid strengthening

D. Supraspinatus isolation exercises

✓ Answer: B

💡 **Rationale & Explanation:**

GIRD treatment: SLEEPER STRETCH — sidelying on the affected shoulder, arm at 90° forward flexion, elbow at 90° flexion, apply gentle internal rotation force; 30-60 seconds × 3-5 times. CROSS-BODY STRETCH — arm across the body in horizontal adduction with overpressure. IMPORTANT: do NOT perform sleeper stretch if anterior instability is present (worsens anterior laxity). Also address: posterior rotator cuff tightness, thoracic extension, scapular dyskinesis.

ORTHOPEDIC ASSESSMENT

219. The 'HOOS' is MOST appropriate for:

A. Elderly patients with end-stage hip OA only

B. Younger, active patients with hip conditions (FAI, labral tears, hip OA, post-arthroplasty) — similar to KOOS for the knee, HOOS includes a SPORT AND RECREATION SUBSCALE relevant to active patients

C. Any knee condition

D. Lumbar spine disability

✓ **Answer: B**

💡 **Rationale & Explanation:**

HOOS (Hip disability and Osteoarthritis Outcome Score): 5 subscales (Pain, Symptoms, ADL, Sport/Recreation, QoL; each 0-100, 100=no problems). BEST FOR: younger, active patients with hip conditions. Compare with WOMAC: no sport subscale — better for older, less active hip OA patients. HOOS for: FAI + labral tear rehabilitation, hip arthroplasty in active adults. HOOS-12 and HOOS-Jr for quick clinical monitoring.

├— ORTHOPEDIC REHABILITATION

220. 'Active Release Technique' (ART) targets:

A. Joint capsules only

B. Scar tissue and adhesions in muscles, tendons, and nerves — using a combination of patient active movement and therapist contact to create shearing force between different tissue layers, breaking up adhesions and improving tissue gliding

C. Bony spurs

D. Ligament tears

✓ **Answer: B**

💡 **Rationale & Explanation:**

ART (P. Michael Leahy): MECHANISM: 1) IDENTIFY the adhesion or restricted tissue; 2) CONTACT: specific pressure at the adhesion; 3) PATIENT ACTIVE MOVEMENT: patient moves the limb AWAY from the contact point while the therapist maintains pressure → creates SHEARING between tissue layers → breaks adhesions. INDICATIONS: myofascial adhesions, nerve entrapments (CTS, cubital tunnel), tendinopathies, post-surgical adhesions, IT band syndrome, Achilles tendinopathy.

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221. The 'single-leg squat' showing excessive knee valgus indicates:

A. Adequate hip control

B. Hip abductor and external rotator weakness — allowing femoral adduction and internal rotation ('knee caving in'); associated with PFPS, ACL injury risk, and IT band syndrome

C. Ankle weakness only

D. Normal alignment

✓ Answer: B

💡 **Rationale & Explanation:**

Single-leg squat (SLS) assessment: ABNORMAL FINDING: knee valgus (femoral adduction + internal rotation + tibial internal rotation + midfoot pronation); contralateral pelvic drop. CAUSES: gluteus medius weakness; hip ER weakness; poor neuromuscular control; subtalar overpronation. CLINICAL USE: ACL injury screening; PFPS diagnosis and monitoring; return-to-sport testing. REHABILITATION: hip abductor + ER strengthening → reduces dynamic valgus → reduces PFPS and ACL risk.

├— ORTHOPEDIC ASSESSMENT

222. The KT-1000 arthrometer measures:

A. Quadriceps strength

B. Side-to-side difference in anterior tibial displacement under standardized force — >3mm side-to-side at 134N = ACL laxity

C. IT band tightness

D. Patellar mobility

✓ Answer: B

💡 **Rationale & Explanation:**

KT-1000: instrumented ACL laxity measurement. Patient supine, knee at 30°; arthrometer strapped to tibia; standardized posterior-to-anterior force applied (89N, 134N, or maximum manual). INTERPRETATION: <3mm = normal; 3-5mm = mild laxity; >5mm =

significant ACL laxity. More OBJECTIVE than Lachman test. Used in: ACL diagnosis; post-reconstruction outcome monitoring; research outcome measurement.

ORTHOPEDIC REHABILITATION

223. A rigid orthosis is PREFERRED over taping when:

A. For all conditions

B. SUSTAINED, CONSISTENT MECHANICAL SUPPORT is needed over weeks or months — e.g., flat foot requiring continuous medial arch support, ankle instability during sport, CTS requiring night splinting; taping provides temporary support (3-5 days) better for short-term management and proprioceptive feedback

C. Taping is always preferred

D. Never — taping is always adequate

✓ Answer: B

💡 **Rationale & Explanation:**

Taping vs. orthotics: TAPING: immediate, adjustable, cost-effective short-term; provides proprioceptive feedback; good for acute injuries and assessment. ORTHOSIS: consistent support 24/7 over months; cost-effective long-term; standardized mechanical correction; custom orthotics for complex biomechanical faults. DECISION: tape first to determine if mechanical support helps → if beneficial, order an orthosis; if patient cannot tolerate tape adhesive (allergy, fragile skin) → orthosis required.

ORTHOPEDIC ASSESSMENT

224. The 'Froment's sign' tests the function of:

A. Median nerve (opponens pollicis)

B. Adductor pollicis (ulnar nerve) — the patient flexes the distal thumb (using FPL, median nerve) to compensate for the paralyzed adductor pollicis when holding a piece of paper between thumb and index finger

C. Radial nerve (EPL)

D. Long thoracic nerve

✓ Answer: B

💡 **Rationale & Explanation:**

Froment's sign: the ADDUCTOR POLLICIS (ulnar nerve, deep branch) provides key pinch. In ULNAR NERVE PALSY: adductor pollicis paralyzed → patient uses FPL (flexor pollicis longus — MEDIAN nerve) to flex the IP joint of the thumb to maintain key pinch → thumb IP joint conspicuously FLEXES. Positive Froment's = ulnar nerve palsy. JEANNE'S SIGN accompanies Froment's: MCP joint hyperextends during the same pinch test. Together: diagnostic of ulnar nerve palsy affecting the deep branch.

ORTHOPEDIC REHABILITATION

225. 'Prehabilitation' before elective surgery:

A. Is rehabilitation after surgery only

B. EXERCISE AND REHABILITATION BEFORE SURGERY to optimize physical condition and reduce post-operative recovery time — stronger, fitter patients recover faster and have better surgical outcomes

C. Only psychological preparation

D. Only education before surgery

✓ Answer: B

💡 **Rationale & Explanation:**

Prehabilitation evidence: pre-operative PT-guided exercise produces: FASTER RETURN TO FUNCTION post-op; SHORTER HOSPITAL STAYS; REDUCED POST-OP COMPLICATIONS; BETTER LONG-TERM OUTCOMES.

MECHANISMS: higher functional baseline post-op; established exercise habits pre-op; reduced fear. EVIDENCE: for TKA and THA — pre-operative quadriceps strength is the strongest predictor of early post-op function; 6-12 week pre-hab programs significantly reduce hospital stay and speed return to independence. PHILIPPINE CONTEXT: underutilized due to coverage gaps — PT advocacy for pre-surgical rehabilitation is important.

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226. The 'posterior chain' in rehabilitation refers to:

A. Only the hamstrings

B. The interconnected series of muscles along the posterior body — gastrocnemius-soleus, hamstrings, gluteus maximus, erector spinae, latissimus dorsi, trapezius — working together for propulsion, posture, and spinal stabilization

C. Only the erector spinae

D. Only the shoulder muscles

✓ Answer: B

💡 **Rationale & Explanation:**

Posterior chain training: during DEADLIFT: glutes, hamstrings, erector spinae, lats, traps all co-contract. During SPRINTING: hamstrings decelerate the swing leg; glutes drive hip extension. REHABILITATION: after lower extremity or lumbar injury, restoring POSTERIOR CHAIN COORDINATION is as important as isolated muscle strengthening. EXERCISES: deadlifts, kettlebell swings, Nordic hamstring curls, glute-ham raises, Romanian deadlifts. INJURY PREVENTION: strong posterior chain reduces hamstring strains, ACL injuries, low back pain.

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227. McKenzie cervical Derangement 7 (lateral shift) treatment sequence:

A. Extension exercises immediately

B. Lateral shift CORRECTION first (contralateral lateral glide), then EXTENSION EXERCISES once the shift is corrected

C. Flexion exercises

D. Cervical traction only

✓ Answer: B

💡 **Rationale & Explanation:**

McKenzie Derangement 7: cervical lateral deviation — head shifted away from the side of pain, accompanying severe radiculopathy. TREATMENT SEQUENCE: 1) LATERAL SHIFT CORRECTION: patient performs contralateral lateral glide (slides head to opposite side of the shift); repeat until shift resolves; 2) Once centered, introduce EXTENSION EXERCISES (retraction + extension). Attempting extension BEFORE correcting the shift is ineffective or harmful. This parallels the lumbar lateral shift correction for disc herniation.

├— ORTHOPEDIC ASSESSMENT

228. Thomas test specificity for RECTUS FEMORIS (vs. iliopsoas) is that the knee:

A. The hip rises off the table

B. With the test hip at table level, FURTHER PASSIVE KNEE FLEXION causes the hip to RISE off the table — the rectus femoris (biarticular, crossing both hip and knee) is tight

C. The leg abducts

D. Pain occurs with hip extension

✓ Answer: B

💡 **Rationale & Explanation:**

Thomas test rectus femoris isolation: STANDARD THOMAS TEST: if test HIP rises off the table = ILIOPSOAS TIGHTNESS. RECTUS FEMORIS SPECIFICITY: with the hip at table level, passively FLEX THE TEST KNEE: if the hip RISES when the knee flexes → RECTUS FEMORIS TIGHTNESS (shortening over two joints). If knee resists flexion and springs back into extension when released = also rectus femoris tight. This Kendall modification distinguishes iliopoas (hip rises in all positions) from rectus femoris (hip only rises when the knee is also flexed).

ORTHOPEDIC REHABILITATION

229. In tibial stress fracture management, the PT's primary role includes:

A. Performing bone stimulation therapy

B. Identifying and correcting contributing factors (training errors, biomechanics, nutrition) while managing the activity modification phase, then guiding gradual return to running

C. Surgery referral always

D. Prescribing medications

✓ Answer: B

💡 **Rationale & Explanation:**

Tibial stress fracture PT management: DIAGNOSIS: point tenderness, positive tuning fork test, clinical history → MRI (most sensitive). LOW-RISK: 6-8 weeks non-impact (pool running, cycling) → pain-free walking → graded return to running. PT ROLES: 1) Identify training errors (sudden mileage increases); 2) Biomechanical analysis (pronation, hip abductor weakness, running mechanics — increase step rate to reduce impact); 3) Nutritional referral if RED-S suspected; 4) Return-to-running protocol (8-10 week structured progression).

ORTHOPEDIC ASSESSMENT

230. Shoulder rotation at 90° abduction: GIRD is defined as:

A. <10° IR difference

B. Dominant shoulder IR deficit >20° compared to the non-dominant side — assessed at 90° abduction (scapular plane preferred)

C. Any IR restriction

D. Reduced ER only

✓ Answer: B

💡 **Rationale & Explanation:**

GIRD (Glenohumeral Internal Rotation Deficit) assessment: measured at 90° shoulder abduction. Normal throwing shoulder: increased ER, decreased IR (posterior capsule adaptation). GIRD: ≥20° side-to-side IR deficit. TOTAL ARC CONCEPT: if total ER + IR = 180° on both sides (just shifted toward ER) = normal adaptation; if total arc is REDUCED on dominant side = true capsular restriction requiring treatment. GIRD → posterior capsule tightening → superoposterior humeral head migration → subacromial impingement + SLAP risk.

ORTHOPEDIC REHABILITATION

231. The lumbar stabilization training progression correct order is:

A. Random order

B. Stage 1: isolated deep muscle activation (TrA, multifidus) in neutral → Stage 2: integration with limb movements (dead bugs, bird dogs) → Stage 3: functional positions (standing, sport-specific) → Stage 4: dynamic loaded functional tasks

C. Start with heavy lifting

D. Passive treatment first

✓ Answer: B

💡 **Rationale & Explanation:**

Stabilization progression (Richardson, Hodges, Hides model): STAGE 1 (COGNITIVE): isolated TrA + multifidus activation in lying, no load, low level; goal: establish voluntary control. STAGE 2 (ASSOCIATE): maintain activation during limb movements; moderate load. STAGE 3 (AUTONOMOUS): automatic activation during functional standing tasks; gait training. STAGE 4 (DYNAMIC): heavy exercises with maintained spinal control. Do NOT rush to Stage 4 — premature loading without Stage 1-2 control is the most common error in lumbar instability management.

ORTHOPEDIC ASSESSMENT

232. The 'navicular drop test' measures:

A. Ankle instability

B. Subtalar pronation — the navicular tuberosity height is measured in subtalar neutral and in relaxed bilateral standing; the difference = navicular drop; normal <10mm; >10mm = excessive pronation

C. Achilles tendon length

D. Tibial torsion

✓ Answer: B

💡 **Rationale & Explanation:**

Navicular drop test (Brody, 1982): 1) Patient standing on one foot, examiner places subtalar joint in neutral (palpates equal talar head convexity medially/laterally) → marks navicular height; 2) Patient stands normally (both feet) → marks new navicular height; 3) Measure difference. Normal: <10mm. 10-15mm = mild-moderate; >15mm = excessive pronation. Used to assess contribution of foot pronation to: MTSS, plantar fasciitis, PFPS, Achilles tendinopathy. Guides orthotic prescription.

ORTHOPEDIC REHABILITATION

233. The 'hip hinge' movement pattern is ESSENTIAL for:

A. Biceps curl exercises

B. Any task involving bending forward to pick up objects — teaching the hip hinge protects the lumbar spine by transferring load to the large hip muscles (glutes, hamstrings) rather than the spinal erectors, reducing disc loading

C. Only elderly patients

D. Swimming technique

✓ Answer: B

💡 **Rationale & Explanation:**

Hip hinge fundamentals: TECHNIQUE: NEUTRAL SPINE maintained throughout; PUSH HIPS BACK (posterior translation) rather than bending at the waist; slight knee bend; bar or object stays close to the body; load carried by GLUTES + HAMSTRINGS. BIOMECHANICS: spinal FLEXION DOMINANT lifting → high disc compressive + flexion + shear forces; HIP HINGE → spine neutral → 50-75% reduction in spinal compressive force. Teaching the hip hinge is a CORE COMPETENCY for occupational and sports rehabilitation.

ORTHOPEDIC ASSESSMENT

234. The 'navicular stress fracture' is high-risk because:

A. It always heals spontaneously

B. The central third of the navicular has poor blood supply (watershed zone) — high risk of delayed union, non-union, and avascular necrosis if not adequately offloaded

C. It is always obvious on X-ray

D. It only occurs in non-athletes

✓ **Answer: B**

💡 **Rationale & Explanation:**

Navicular stress fracture: BLOOD SUPPLY: medial and lateral plantar arteries enter peripherally; the CENTRAL THIRD = watershed zone. CONSEQUENCES: high non-union risk, AVN risk if blood supply further compromised. MANAGEMENT: 6-8 weeks NON-WEIGHT-BEARING boot → MRI confirmation of healing → gradual return. Surgical fixation for displaced or non-union. DIAGNOSIS: often NEGATIVE on X-ray — MRI essential. Athletes who run through navicular stress fractures have extremely poor outcomes.

ORTHOPEDIC REHABILITATION

235. The 'box jump' plyometric exercise belongs to which rehabilitation phase?

A. Week 2 post-injury

B. Late rehabilitation (4-6+ months post-injury) — after full pain-free ROM, strength ≥80-90% LSI, neuromuscular control, and progressive plyometric program are achieved

C. Week 1 post-surgery

D. During acute inflammation

✓ Answer: B

💡 **Rationale & Explanation:**

Plyometric progression for RTS: PREREQUISITES before jumping: pain-free single-leg squat to 60°, hop test LSI ≥80-90%, adequate quadriceps and hamstring strength. PROGRESSION: bilateral squat jump → bilateral box jump → bilateral depth jump → unilateral forward hop → lateral hop → 90° cut → 180° cut → reactive cuts. BOX JUMP ONTO a box = lower demand; BOX JUMP OFF = higher demand; DEPTH JUMP = highest demand (reactive). For ACL reconstruction: box jumps appropriate at 4-6 months when all criteria are met.

ORTHOPEDIC ASSESSMENT

236. Normal end-feel for shoulder external rotation:

A. Empty (no tissue resistance)

B. Soft, elastic, tissue stretch end-feel — from the anterior capsule, glenohumeral ligaments, and subscapularis muscle; a progressive elastic resistance as the joint approaches maximum ER

C. Bone-to-bone (hard stop)

D. Springy block

✓ Answer: B

💡 **Rationale & Explanation:**

Shoulder ER normal end-feel: NORMAL = TISSUE STRETCH (soft, elastic, progressive resistance from anterior capsule — IGHL anterior band, coracohumeral ligament, subscapularis). PATHOLOGICAL: Adhesive capsulitis = HARD CAPSULAR end-feel (leathery, abrupt from fibrosis); Bony block = HARD bone-on-bone; Muscle guarding = SPASM end-feel; Hypermobility = soft end-feel at increased range. Cyriax end-feel classification: normal (bone-to-bone, capsular, tissue approximation) vs. pathological (spasm, springy block, empty).

ORTHOPEDIC REHABILITATION

237. Neural mobilization 'SLIDER' vs. 'TENSIONER' techniques:

A. Both are identical

B. SLIDER: one end is tensioned while the OTHER END IS RELAXED — creating nerve GLIDING without maximum tension; used for acute/irritable conditions. TENSIONER: both ends tensioned simultaneously — used for chronic conditions

C. Sliders are never used

D. Tensioners are always safer

✓ Answer: B

💡 Rationale & Explanation:

Neurodynamic technique selection: SLIDER: move in one direction (tension) while simultaneously moving AWAY from tension at the adjacent level (relaxed) → nerve SLIDES through surrounding tissues. Example median nerve slider: extend elbow (tension) while FLEXING wrist (relax at distal end). TENSIONER: TENSION BOTH ENDS → maximum stretch of neural tissue. Use for chronic conditions where mobility is the primary restriction. Clinical rule: start with sliders for acute/sensitive presentations; progress to tensioners cautiously as symptoms allow.

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238. The inclinometer advantage over goniometer for SPINAL ROM:

A. Lower cost

B. Greater reliability and validity for spinal ROM — gravity-referenced measurement independent of examiner landmark identification; double inclinometer method separates true lumbar motion from hip flexion contribution

C. Easier to use

D. Measures more planes simultaneously

✓ Answer: B

💡 Rationale & Explanation:

Inclinometer for spinal ROM: GRAVITY-REFERENCED: measures body segment inclination relative to vertical — no precise landmark identification needed. DOUBLE INCLINOMETER METHOD: one at T12, one at S1; forward bend; T12 reading - S1 reading = TRUE LUMBAR FLEXION (subtracts the hip component). RELIABILITY: ICC >0.90 for lumbar and cervical ROM. CROM DEVICE: uses inclinometers + compass for all cervical planes simultaneously — gold standard for cervical ROM measurement.

├─ ORTHOPEDIC ASSESSMENT

239. The 'pivot shift' phenomenon in the knee is caused by:

A. Meniscal catching

B. The anterolaterally subluxed tibia suddenly REDUCING as the iliotibial band transitions from extensor to flexor function at approximately 30-40° knee flexion — the IT band posterior to the axis at 30° flexion pulls the tibia posteriorly, reducing the anterior subluxation with a clunk

C. Cruciate ligament palpation

D. Patellar catching

✓ Answer: B

💡 Rationale & Explanation:

Pivot shift mechanism: ACL-DEFICIENT knee: 1) Near extension: IT band ANTERIOR to axis → extensor → pulls tibia anteriorly → lateral tibial plateau SUBLUXES anterolaterally. 2) At ~30-40° flexion: IT band crosses the axis → becomes FLEXOR → pulls tibia posteriorly → subluxed tibia REDUCES with a CLUNK. The pivot shift clunk = this sudden reduction. Explains why the test is done starting in extension (subluxed) and flexing (observing reduction).

ORTHOPEDIC REHABILITATION

240. 'Function-based outcome measures' are preferred over impairment-based measures because:

A. They are easier to score

B. They capture what matters most to the patient — the ability to perform meaningful activities (ADLs, sport, work) — whereas impairment measures (ROM, MMT) may improve without patient-perceived functional benefit

C. They require no training

D. They are always shorter

✓ Answer: B

💡 **Rationale & Explanation:**

Function-based vs. impairment-based: IMPAIRMENT: ROM degrees, MMT grades — important for clinical assessment but don't always reflect patient priorities. FUNCTION-BASED: WOMAC, KOOS, DASH, ODI, 6MWT, TUG — measure what the patient can DO in daily life. PATIENT PERSPECTIVE: functional ability is consistently rated more important than impairment measurements. RECOMMENDATION: use BOTH — impairment measures guide clinical decision-making; function-based measures assess overall effectiveness. GOAL SETTING: connect impairment-level goals to function-level patient goals ('increasing knee flexion by 20° will allow you to kneel at church').

ORTHOPEDIC ASSESSMENT

241. The 'dorsal wrist ganglion' is assessed by:

A. X-ray only

B. Transillumination (the fluid-filled cyst transmits light) and compression test — diagnosis is clinical; MRI confirms if uncertain

C. Bone scan

D. EMG

✓ Answer: B

💡 Rationale & Explanation:

Dorsal wrist ganglion: most common soft tissue mass of the hand (60-70% of hand tumors). LOCATION: dorsum of the wrist (scapholunate ligament). CONTENTS: thick, mucoid fluid. CLINICAL: smooth, partially compressible mass; fluctuates in size. TRANSILLUMINATION: shining a penlight through the mass in a dark room — fluid-filled cyst transmits light = ganglion confirmed. MANAGEMENT: 60-70% spontaneously resolve; aspiration (40-50% recurrence); surgical excision (~5-10% recurrence). PT: reassurance, activity modification if symptomatic, wrist stability exercises.

ORTHOPEDIC REHABILITATION

242. Combined Maudsley's test + ECRB palpation tenderness gives the best diagnostic specificity for:

A. Medial epicondylitis

B. Lateral epicondylitis (ECRB tendinopathy) — Maudsley's (resisted middle finger extension) + focal tenderness at the ECRB origin (1-2 cm anterior and distal to the lateral epicondyle) = high diagnostic certainty

C. Bicipital tendinitis

D. Pronator syndrome

✓ **Answer: B**

💡 **Rationale & Explanation:**

Combined testing for lateral epicondylitis: ECRB origin: 1-2 cm ANTERIOR and DISTAL to the most prominent part of the lateral epicondyle. PALPATION: direct pressure → focal, exquisite tenderness in lateral epicondylitis. MAUDSLEY'S: specifically loads ECRB via resisted middle finger extension. TREATMENT PROGRESSION: 1) Load management; 2) Isometrics; 3) Eccentric wrist extension; 4) Heavy Slow Resistance; 5) Functional grip/sport loading. PRP injections for refractory cases (>6 months conservative management failure).

├— ORTHOPEDIC ASSESSMENT

243. The 'lateral pivot shift of the elbow' (PLRI test) diagnoses:

A. Medial UCL tear

B. Posterolateral rotatory instability (PLRI) of the elbow — LUCL insufficiency; positive when the radial head subluxes posterolaterally with a visible dimple or frank dislocation

C. Lateral epicondylitis

D. Biceps tendon rupture

✓ **Answer: B**

💡 **Rationale & Explanation:**

PLRI test for elbow: LUCL (lateral ulnar collateral ligament) torn → radius and ulna rotate posterolaterally under the distal humerus. TECHNIQUE: patient supine, shoulder at 90° forward flexion; examiner holds wrist, keeping forearm SUPINATED; apply AXIAL COMPRESSION + VALGUS FORCE; flex the elbow from extension. POSITIVE: at ~40° flexion, radial head subluxes posteriorly — a DIMPLE appears proximal to the radial head; at 90° flexion the joint REDUCES. Often requires examination under anesthesia. TREATMENT: acute LUCL → casting in pronation; chronic instability → surgical reconstruction.

ORTHOPEDIC REHABILITATION

244. Graded exercise therapy (GET) for CFS/ME is currently:

A. The gold standard

B. CONTROVERSIAL AND NO LONGER RECOMMENDED by NICE 2021 — evidence shows GET can cause post-exertional malaise (PEM) and worsen CFS/ME; current recommendations focus on energy management, pacing, and symptom-driven activity

C. Universally recommended

D. Always safe

✓ Answer: B

💡 Rationale & Explanation:

GET controversy in CFS/ME: HISTORICAL: GET was recommended based on deconditioning model. PARADIGM SHIFT: PACE trial criticism + patient-reported data showing GET worsened many CFS/ME patients. POST-EXERTIONAL MALAISE (PEM): hallmark of CFS/ME — symptoms worsen disproportionately after exertion. NICE 2021: explicitly recommend AGAINST GET for CFS/ME; recommend ENERGY MANAGEMENT (pacing, staying within the energy envelope). PT ROLE: assessment; pacing education; activity planning within symptom limits — not progressive aerobic exercise protocols.

ORTHOPEDIC ASSESSMENT

245. The 'Shoulder Abduction Relief Sign' (SARS/Bakody sign) is positive when:

A. Shoulder pain worsens with abduction

B. Abducting the arm (placing the hand on top of the head) RELIEVES CERVICAL RADICULOPATHY SYMPTOMS — reduces tensile stretch on the nerve root; positive in C5-C6 nerve root compression

C. Only elbow symptoms are tested

D. Active abduction fails

✓ **Answer: B**

💡 **Rationale & Explanation:**

SARS / Bakody sign: MECHANISM: placing the hand on top of the head reduces tension on the lower brachial plexus (especially C5-C6) → relieves radicular symptoms. DIFFERENTIATES from shoulder pathology: impingement/shoulder pain → placing hand on head COMPRESSES subacromial space → pain INCREASES. Radiculopathy → nerve tension REDUCED → pain DECREASES. Positive SARS = nerve root source; negative or worsened = more likely local shoulder pathology.

ORTHOPEDIC REHABILITATION

246. The Deep Neck Flexor CCFT protocol begins at:

A. Maximum effort immediately

B. LOW PRESSURE LEVELS (22 mmHg on pressure biofeedback) and only progresses when each stage can be maintained for 10 seconds × 10 repetitions pain-free — isolating longus colli and capitis from the superficial flexors (SCM, anterior scalene)

C. Full chin-to-chest flexion

D. Cervical extension exercises

✓ **Answer: B**

💡 **Rationale & Explanation:**

CCFT protocol: pressure biofeedback cuff baseline = 22 mmHg. STAGES: 22→24→26→28→30 mmHg. TECHNIQUE: patient supine; GENTLY NODS (cranio-cervical flexion — chin slightly moves toward chest, flexion at C0-C1, C1-C2); pressure should rise to target WITHOUT SCM or anterior scalene becoming prominent. CLINICAL SIGNIFICANCE: patients with cervicogenic headache, whiplash, neck pain consistently fail at level 22-26 mmHg without SCM activation — specific deep cervical flexor inhibition. Progressive CCFT training restores neuromuscular control and reduces neck pain.

ORTHOPEDIC ASSESSMENT

247. The 'active slump test' differs from the passive slump test in:

A. They are identical

B. The active slump uses active knee extension attempt while the patient maintains the slump position — if active extension reproduces sciatic symptoms that are relieved by extending the cervical spine, the sciatic nerve is the source

C. Only the patient's age

D. Only the speed of the test

✓ Answer: B

💡 **Rationale & Explanation:**

Active slump test: while the standard slump uses PASSIVE knee extension (therapist-applied or gravity), the ACTIVE slump asks the patient to ACTIVELY EXTEND THE KNEE. RATIONALE: adds active hamstring lengthening → more clinical simulation of functional activities like chair rising and walking with full knee extension. POSITIVE ACTIVE SLUMP: symptoms reproduced with active knee extension in slump position, reduced or abolished by releasing cervical flexion → neural tension confirmed. Used for: chronic sciatic pain, comparison to passive slump (if active is more provocative = significant neural sensitization).

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248. The 'shoulder clunk test' for labral tears:

A. Tests subacromial bursitis

B. Applies axial compression and circumduction with the shoulder in forward flexion — positive when a clunk or grinding is felt within the glenohumeral joint, indicating a labral tear

C. Tests AC joint separation

D. Tests rotator cuff integrity

✓ Answer: B

💡 **Rationale & Explanation:**

Shoulder clunk test (Kvitne and Jobe): patient supine. TECHNIQUE: examiner places one hand posterior to humeral head (in axilla), the other on lateral humerus; full forward flexion + slight ER; apply AXIAL LOAD (compression through long axis) while CIRCUMDUCTING the arm. POSITIVE: palpable or audible CLUNK, CATCHING, or GRINDING = labral tear (torn fragment caught between humeral head and glenoid). Sensitivity: moderate (~50-75%); Specificity: moderate-high. Confirm with MRI arthrogram (gold standard for labral tear).

ORTHOPEDIC REHABILITATION

249. Sport-specific training in rehabilitation MUST include:

A. Only gym exercises

B. Movement patterns, speeds, loads, and decision-making demands that specifically replicate the requirements of the target sport — including sport positions, ball handling, reactive movements, and game-pace conditioning

C. Only cardiovascular training

D. Only stretching

✓ Answer: B

💡 **Rationale & Explanation:**

Sport-specific rehabilitation phase: COMPONENTS: 1) MOVEMENT PATTERNS: sport-specific cutting directions; 2) SPEEDS: near-game-speed sprinting and agility; 3) SKILL INTEGRATION: ball handling, throwing mechanics; 4) REACTIVE DECISIONS: responding to a partner or opponent; 5) FATIGUE: performing skills under fatigue conditions; 6) CONTACT: progressive return to contact training in contact sports. CLEARANCE CRITERIA: pain-free at full training load + full sport-speed skills + full confidence + passing all physical testing criteria.

ORTHOPEDIC ASSESSMENT

250. The MCID for the VAS pain scale is approximately:

A. 1 mm

B. 15-20 mm on a 100mm scale — the minimum change representing a clinically meaningful improvement to the patient; changes smaller than this are within measurement error and patient perception thresholds

C. 50 mm

D. 5 mm

✓ Answer: B

💡 Rationale & Explanation:

VAS MCID: the VAS is a 100mm horizontal line. MCID = approximately 15-20 mm (1.5-2 cm) for acute pain; approximately 9-14 mm for chronic pain. NRS (0-10) MCID = approximately 1.5-2 points. CLINICAL SIGNIFICANCE: a 10mm VAS improvement in an acute pain patient is WITHIN MEASUREMENT ERROR — not clinically meaningful. A 25mm improvement → above the MCID → clinically meaningful benefit. MCID prevents overinterpreting statistically significant but clinically trivial changes.

ORTHOPEDIC REHABILITATION

251. The 'POLR protocol' for acute hamstring strains stands for:

A. Physiotherapy, Operations, Loading, Return

B. Protection, Optimal Loading, Reassurance, Ice — a modern replacement for complete rest; early isometric contractions prevent atrophy while protecting healing tissue

C. Passive, Open, Lateral, Rotation

D. Pressure, Oil, Light, Resistance

✓ Answer: B

💡 **Rationale & Explanation:**

POLR for acute hamstring management: PROTECTION: avoid sprinting, overstretching, high-load eccentric activities first 48-72 hours. OPTIMAL LOADING: early ISOMETRIC CONTRACTIONS (submaximal, pain-free range) begin within 24-48 hours — prevents atrophy, maintains structural healing fiber integrity, promotes organized collagen deposition. REASSURANCE: patient education, realistic timeline, avoiding catastrophizing. ICE: for comfort (not critical for healing per PEACE & LOVE evidence). Why not complete rest? Immobilization produces worse collagen organization and longer recovery. Early loading = better aligned collagen = faster recovery.

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252. The 'McKenzie retraction exercise' for cervical pain involves:

A. Maximum cervical extension

B. Gentle RETRACTION of the head straight backward (chin in, not down) — correcting forward head posture and reducing cervical disc pressure anteriorly; particularly effective for centralization of cervical radiculopathy with extension directional preference

C. Lateral flexion exercises

D. Cervical rotation

✓ **Answer: B**

💡 **Rationale & Explanation:**

McKenzie cervical retraction: the patient slides the head straight BACKWARD (horizontal retraction — not chin-to-chest, not hyperextension). EFFECT: restores normal cervical lordosis; reduces forward head posture; reduces anterior disc pressure at C5-C6 and C6-C7 levels; can centralize radicular arm pain in patients with extension directional preference (majority of cervical disc herniation patients). Evidence-based for reducing neck pain and cervical radiculopathy. Frequency: hourly if tolerated. Teach as the primary home exercise for cervical disc with extension directional preference.

ORTHOPEDIC ASSESSMENT

253. Joint line tenderness for meniscal injury has what approximate sensitivity?

A. 30%

B. 75-85% — the most sensitive individual clinical finding for meniscal pathology, despite its simplicity

C. 50%

D. 90%

✓ Answer: B

💡 **Rationale & Explanation:**

Joint line tenderness (JLT): examiner palpates the medial and lateral JOINT LINE for FOCAL TENDERNESS. SENSITIVITY for meniscal tear ~75-85% — one of the HIGHEST sensitivities among individual meniscal tests. SPECIFICITY ~60-70% (less specific — other conditions cause JLT). NEVER OMIT from knee examination — may be the most informative single finding. COMBINE WITH: McMurray + Thessaly + joint effusion assessment + history (locking, giving way, mechanism) for maximum diagnostic accuracy.

├─ ORTHOPEDIC REHABILITATION

254. For MEDIAL COMPARTMENT knee OA, 'lateral wedge insoles' work by:

A. Shifting load to the medial compartment

B. Tilting the foot into eversion, shifting the ground reaction force laterally, reducing the KNEE ADDUCTION MOMENT and thus reducing medial compartment loading

C. Increasing lateral compartment load

D. Correcting hip alignment

✓ Answer: B

💡 **Rationale & Explanation:**

Lateral wedge insoles for medial knee OA: MECHANISM: lateral wedge (thicker laterally) tilts foot into EVERSION → shifts ground reaction force LATERALLY at the knee → REDUCES KNEE ADDUCTION MOMENT (medial compartment loading force) by ~4-8%. EVIDENCE: modest but meaningful pain reduction and function improvement in medial compartment OA. NOT appropriate for lateral compartment OA (would worsen it) or severe flat feet. COMBINE WITH: strengthening, weight management, activity modification, appropriate footwear.

ORTHOPEDIC ASSESSMENT

255. The 'FAOS' (Foot and Ankle Outcome Score) is the foot/ankle equivalent of:

A. WOMAC for the hip

B. KOOS for the knee — a patient-reported outcome measure with subscales for pain, symptoms, ADL, sport/recreation, and quality of life

C. NDI for the neck

D. ODI for the back

✓ Answer: B

💡 Rationale & Explanation:

FAOS: modeled after the KOOS. 5 SUBSCALES: Pain (9 items), Symptoms (7 items), ADL (17 items), Sport/Recreation (5 items), QoL (4 items). Each 0-100 (100 = no problems). MCID: approximately 10-15 points. VALIDATED FOR: ankle sprains, Achilles tendinopathy, plantar fasciitis, ankle OA, post-surgical outcomes. Region-specific PROMSs: DASH = upper extremity; NDI = cervical; ODI = lumbar; KOOS = knee; HOOS = hip; FAOS = foot/ankle.

ORTHOPEDIC REHABILITATION

256. IASTM physiological effects include:

A. Permanent scar tissue removal

B. Disruption of collagen cross-links, stimulation of fibroblast activity, increased local blood flow, and neurophysiological pain modulation — resulting in improved tissue extensibility and reduced pain in fibrotic/tendinopathic tissue

C. Nerve regeneration

D. Bone remodeling

✓ Answer: B

💡 **Rationale & Explanation:**

IASTM mechanisms: 1) MECHANICAL: instrument edge creates controlled microtrauma → disrupts excessive collagen cross-links; 2) BIOLOGICAL: stimulates FIBROBLAST proliferation → new, more organized collagen synthesis; 3) VASCULAR: increases local blood flow (hyperemia after treatment); 4) NEUROPHYSIOLOGICAL: activates descending pain inhibitory pathways. POST-TREATMENT: tissue ready for stretching — always follow with stretching and/or exercise. FREQUENCY: 1-2 sessions/week for 4-6 weeks. PRECAUTIONS: open wounds, acute infection, hematoma, areas without soft tissue protection.

ORTHOPEDIC ASSESSMENT

257. The 'hip scour (quadrant) test' differs from FADIR in that:

A. They are identical tests

B. Hip scouring adds AXIAL COMPRESSIVE LOAD and CIRCUMDUCTION through a range of motion (arc through flexion-adduction-IR to flexion-abduction-ER) — assessing articular surface pathology dynamically; FADIR is a static provocative position

C. FADIR is dynamic, scouring is static

D. Hip scouring is less sensitive

✓ Answer: B

💡 **Rationale & Explanation:**

Hip quadrant/scour test: examiner applies AXIAL COMPRESSIVE LOAD through the femur into the acetabulum, then moves the hip through an arc (flexion + adduction + IR → flexion + abduction + ER). DYNAMIC assessment of articular surface: detects clicks, catches, or restriction indicating cartilage defects, loose bodies, or early OA. Together FADIR (static provocative) + hip quadrant (dynamic compressive) provide comprehensive intra-articular hip screening — both should be part of every thorough hip examination.

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258. The 'Thomas test positive for ILIOPSOAS' (not rectus femoris) shows:

A. Knee extends during testing

B. The HIP OF THE TEST LEG RISES OFF THE TABLE while the knee remains near neutral — indicating hip flexor contracture at the hip (iliopsoas), independent of knee position

C. Leg abducts during lowering

D. Bilateral tightness prevents testing

✓ Answer: B

💡 **Rationale & Explanation:**

Thomas test iliopsoas vs. rectus femoris: ILIOPSOAS TIGHTNESS: test hip RISES off the table (thigh remains above horizontal) — the shortening is at the HIP; knee position doesn't matter much. RECTUS FEMORIS: the hip can lower to the table, but KNEE EXTENDS from its flexed position when further knee flexion is attempted — the shortening is biarticular (hip AND knee). COMBINED: hip rises AND knee extends = both hip flexors tight. Guides specific stretching: isolated hip flexor stretch for iliopsoas vs. kneeling with knee bent for rectus femoris.

├─ ORTHOPEDIC REHABILITATION

259. The 'hip thrust exercise' produces the highest EMG activation of:

A. Quadriceps

B. Gluteus maximus — higher EMG activation than squats, deadlifts, or lunges (~80-100% MVC)

C. Hamstrings only

D. Tibialis anterior

✓ Answer: B

💡 **Rationale & Explanation:**

Hip thrust biomechanics (Brett Contreras): BARBELL HIP THRUST: upper back resting on bench, knees bent, feet flat; drive hips upward (hip extension). EMG STUDIES: hip thrust produces ~80-100% MVC of glute max — HIGHER than squats (50-60% MVC) or deadlifts (70-80% MVC). WHY HIGHER? The HORIZONTAL FORCE VECTOR against the barbell demands maximum hip extension torque through the full range, including terminal extension where squats are weakest for glute activation. REHABILITATION: gluteal amnesia post-LBP surgery, hip OA, PFPS, return to sport after hamstring strain, GTPS rehabilitation.

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260. The 'graded exposure therapy' for CRPS Phase 1 begins with:

A. Aggressive joint mobilization

B. LEFT-RIGHT LIMB RECOGNITION (implicit motor imagery) — identifying limb laterality in images; activates the premotor cortex without triggering the fear-pain cycle; response time and accuracy normalized before progressing

C. High-intensity graded exercise

D. Passive ROM only

✓ Answer: B

💡 **Rationale & Explanation:**

Graded Motor Imagery Phase 1 for CRPS: CLINICAL RATIONALE: CRPS involves cortical reorganization and central sensitization — the brain's representation of the affected limb is distorted. Starting with explicit movement may provoke pain flares. LEFT-RIGHT RECOGNITION (Recognise app): viewing photos of hands/feet, deciding left or right — activates PREMOTOR CORTEX IMPLICITLY. Response time and accuracy

is SLOWER and LESS ACCURATE for the affected limb side in CRPS (cortical disorganization). NORMALIZING left-right recognition trains cortical representation WITHOUT triggering the pain system. PROGRESSION: >80% accuracy AND symmetric response time → Phase 2 (explicit motor imagery).

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261. The 'modified Schober test' measures:

A. Hip flexion

B. Lumbar flexion ROM — marks 10 cm above and 5 cm below S1; normal = ≥5 cm increase with forward bending; reduced <5 cm increase = limited lumbar flexion

C. Thoracic kyphosis

D. SIJ mobility

✓ Answer: B

💡 **Rationale & Explanation:**

Modified Schober test: MARK: S1 (dimples of Venus), 10 cm above, 5 cm below = 15 cm distance. Patient bends forward maximally. MEASURE new distance. NORMAL: increases by at least 5 cm → ≥20 cm total. REDUCED (<5 cm): limited lumbar flexion — seen in ankylosing spondylitis (serial Schober monitoring is the standard), chronic LBP with stiffness. Compare with fingertip-to-floor test (less specific — includes hip flexion). Schober specifically measures LUMBAR MOBILITY only.

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262. The 'Pilates' approach in rehabilitation emphasizes:

A. High-impact aerobic exercise

B. Core stability, neutral spine control, breathing coordination, and precise movement quality — focusing on activating deep stabilizers (TrA, multifidus, pelvic floor) while performing controlled limb movements

C. Pure flexibility training

D. Only spinal stretching

✓ Answer: B

💡 **Rationale & Explanation:**

Clinical Pilates for rehabilitation: PRINCIPLES: Concentration, Centering (powerhouse = TrA + multifidus + pelvic floor + diaphragm), Control, Breathing, Precision, Flow. REHABILITATION EVIDENCE: moderate-strong for chronic LBP; pelvic floor dysfunction; scoliosis exercises (Pilates-based programs reduce progression in mild-moderate scoliosis). PT TRAINING: clinical Pilates rehabilitation training is distinct from Pilates instructor certification — PTs should complete a recognized clinical program.

├— ORTHOPEDIC ASSESSMENT

263. The 'Y-Balance test' (SEBT) POSTEROMEDIAL direction is most predictive of:

A. Shoulder injuries

B. Lower extremity injury risk — posteromedial reach <70% of limb length associated with 6.5× greater odds of ankle injury (Plisky 2006); asymmetry >4 cm between sides = significant risk for ACL, ankle sprain, and overall LE injury

C. Upper limb balance

D. Cognitive performance

✓ Answer: B

💡 **Rationale & Explanation:**

SEBT posteromedial direction significance: requires: single-leg balance; adequate hip extension + abduction strength; eccentric hamstring and gluteal loading; complex neuromuscular coordination. Deficits in all these dimensions predict LE injury. ACL RTS: Y-Balance LSI ≥90% in all three directions as part of comprehensive RTS testing battery. REHABILITATION: target neuromuscular deficits identified on SEBT/Y-Balance testing for efficient, targeted training programs.

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264. The 'stress fracture risk assessment' in athletes primarily considers:

A. Running speed only

B. Training load (sudden volume/intensity increase), bone health (low BMD, RED-S, vitamin D deficiency), biomechanics (excessive pronation, hip abductor weakness), and footwear

C. Gender only

D. Fatigue level only

✓ Answer: B

💡 **Rationale & Explanation:**

Stress fracture risk stratification: HIGH-RISK SITES: femoral neck, sacrum, tarsal navicular, 5th MT diaphysis (Jones fracture), sesamoids, medial malleolus — require more conservative management. LOWER-RISK SITES: tibia shaft, fibula, metatarsal shafts 2-4. RISK FACTORS: female sex + low energy availability (RED-S) = highest overall risk; sudden training increases; hard surfaces; worn-out footwear; prior stress fracture; amenorrhea. CLINICAL SIGNS: point tenderness on bone; pain with weight-bearing; positive hop test; positive tuning fork test. IMAGING: MRI is gold standard — X-ray often negative for 2-3 weeks.

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265. The 'PRWE' (Patient-Rated Wrist Evaluation) is MOST SPECIFIC to which region?

A. Knee

B. Wrist — 15 items measuring wrist pain (5 items) and wrist function (10 items); total 0-100; MCID ~11.5 points; more responsive to wrist-specific changes than the DASH

C. Hip

D. Lumbar spine

✓ Answer: B

💡 **Rationale & Explanation:**

PRWE (MacDermid): 15 items: PAIN (5 items: rest, repetitive use, specific activities). FUNCTION (10 items: 6 specific activities + 4 usual activities). Total 0-100 (0 = no impairment). VALIDATED FOR: distal radius fractures (most common use), TFCC tears, CTS post-surgery,

wrist OA. MCID: ~11.5 points. Compare with DASH: measures the entire UE (less sensitive to isolated wrist-specific changes). PRWE preferred when the primary complaint is wrist-specific — especially after distal radius fractures.

ORTHOPEDIC REHABILITATION

266. The 'aquatic treadmill' is used in rehabilitation because:

A. It only benefits cardiovascular fitness

B. Combining water buoyancy (reduces weight-bearing by 60-90%), hydrodynamic resistance, and treadmill speed control allows gait training at reduced body weight loading — enabling earlier ambulation after TKA, THA, obesity, or post-fracture rehabilitation

C. It is only for elite athletes

D. It provides no proprioceptive input

✓ Answer: B

💡 **Rationale & Explanation:**

Aquatic treadmill therapy: WATER LEVEL EFFECTS: hip-level = ~40-50% weight reduction; waist-level = ~50%; chest-level = ~60-70%; shoulder-level = ~75-80%. SPEED CONTROL allows progressive loading without terrain concerns. RESISTANCE: water viscosity provides gentle proprioceptive input and resistance for strengthening. CLINICAL APPLICATIONS: post-TKA/THA (early ambulation with reduced joint loading); knee/hip OA; post-ACL reconstruction; morbid obesity; neurological gait retraining (incomplete SCI, stroke). Enables EARLIER AMBULATION than traditional land-based protocols.

ORTHOPEDIC ASSESSMENT

267. The 'Neer's impingement injection test' confirms subacromial impingement when:

A. Injection reproduces pain

B. Pain is COMPLETELY RESOLVED by injection of local anesthetic into the subacromial bursa — confirms the subacromial space as the pain source, distinguishing from AC joint or GHJ pathology

C. It causes immediate strength improvement

D. Surgery is always required after

✓ Answer: B

💡 **Rationale & Explanation:**

Neer's injection test: inject 10 mL of local anesthetic into the subacromial bursa. Repeat the Neer impingement sign. POSITIVE INJECTION TEST: pain completely eliminated = confirms SUBACROMIAL BURSA as the pain source. NEGATIVE: pain persists = pain originates elsewhere (GHJ, AC joint, cervical spine) — subacromial decompression surgery will likely not help. Clinical utility: when imaging and clinical examination are inconclusive; before planning subacromial decompression surgery; distinguishing multiple potential shoulder pain sources.

├— ORTHOPEDIC REHABILITATION

268. Post-cast distal radius fracture rehabilitation FIRST PRIORITY is:

A. Strengthening wrist flexors

B. Restoring wrist and forearm ROM (especially pronation/supination) combined with edema control and active-assisted exercises — strengthening begins after adequate ROM is restored

C. Returning to sport immediately

D. Ignoring pain to force movement

✓ Answer: B

💡 **Rationale & Explanation:**

Post-cast distal radius fracture sequence: IMMEDIATE POST-CAST: 1) ROM (wrist and forearm — pronation/supination most restricted); 2)

EDEMA (retrograde massage, elevation, compression sleeve); 3) PAIN MANAGEMENT (ice, gentle movement, pacing). PROGRESSIVE SEQUENCE: Weeks 6-8: gentle active and AAROM; finger tendon gliding; Weeks 8-10: progressive wrist strengthening; Weeks 10-12: functional strengthening, ADL retraining; 3-6 months: return to sport/heavy occupation. WATCH FOR: CRPS Type 1 (disproportionate pain, allodynia, autonomic changes).

ORTHOPEDIC ASSESSMENT

269. The 'anterior drawer test' for the shoulder assesses:

A. ACJ stability

B. Anterior glenohumeral instability — examiner stabilizes the scapula and applies an anterior directed force to the humeral head; excessive anterior translation and/or patient apprehension = positive

C. Biceps tendon integrity

D. Supraspinatus tear

✓ Answer: B

💡 Rationale & Explanation:

Anterior shoulder drawer test (Gerber and Ganz): patient sitting or supine. Examiner: one hand stabilizes the scapula (coracoid and scapular spine), other hand grasps proximal humerus. Apply ANTERIOR FORCE to the humeral head while stabilizing the scapula. POSITIVE: excessive anterior translation (>25% humeral head width) compared to the opposite side, OR patient becomes apprehensive. Grading: 0=no translation; 1=up to 25%; 2=up to 50%; 3=>50% or locking over rim. Combined with APPREHENSION-RELOCATION test for comprehensive anterior instability assessment.

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270. The 'cross-SLR' (contralateral SLR) has the highest SPECIFICITY for:

A. IT band tightness

B. Large central or paracentral lumbar disc herniation — raising the contralateral leg reproduces ipsilateral leg symptoms; specificity ~90%

C. Piriformis syndrome

D. Hip OA

✓ Answer: B

💡 **Rationale & Explanation:**

Crossed SLR: raise the UNAFFECTED leg. POSITIVE: this reproduces pain in the AFFECTED (symptomatic) leg. SENSITIVITY: ~25-43% (misses many disc herniations). SPECIFICITY: ~90% (if positive, almost certainly a significant, often central, disc herniation). Clinical use: NEGATIVE crossed SLR cannot rule out disc herniation; POSITIVE crossed SLR = significant disc herniation requiring imaging and possible surgical consultation. A high-specificity, low-sensitivity test used to CONFIRM significant pathology when positive.

├─ ORTHOPEDIC REHABILITATION

271. The 'deloading' phase in tendinopathy management is FIRST because:

A. Tendons require complete rest

B. Tendons in the reactive/early degenerative phase need a REDUCTION IN LOAD to below the pain and structural tolerance threshold — not complete rest (which causes further degeneration), but load management that keeps symptoms at ≤3/10 during activity

C. High load must be applied immediately

D. Stretching is always first

✓ Answer: B

💡 **Rationale & Explanation:**

Tendinopathy load management (Cook and Purdam model): REACTIVE TENDINOPATHY: acutely overloaded — needs specific load reduction (modify the activities causing load spikes) while introducing isometric exercises (analgesic; allows muscle loading without high tendon

stress). THEN PROGRESS: isometrics → isotonic, heavy slow resistance → plyometrics → sport-specific. KEY PRINCIPLE: tendons need appropriate load to heal — complete rest = atrophy + degeneration; appropriate graduated load = adaptation.

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272. 'Eccentric decline squats' for patellar tendinopathy are performed on a 25° declined surface because:

A. Makes exercise harder generally

B. The decline reduces ankle dorsiflexion demand — isolating the ECCENTRIC QUADRICEPS/PATELLAR TENDON LOAD without the calf muscle contribution, maximizing the therapeutic loading stimulus on the patellar tendon

C. It provides ankle support

D. It reduces knee flexion range

✓ Answer: B

💡 **Rationale & Explanation:**

Decline squat mechanism: standard squats involve significant ankle DF contribution (calf absorbs load). On a DECLINED SURFACE: ankle DF demand reduced → knee/quad/patellar tendon bears a GREATER proportion of the load → HIGHER PATELLAR TENDON STRESS. PROTOCOL (Alfredson-style): 3×15 reps twice daily, into pain (NRS 3-4/10 acceptable). Evidence: single-leg decline squat program shows superior results vs. flat ground squats for patellar tendinopathy. After pain-free movement achieved: progress to plyometrics.

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273. The 'initial orthotic approach' for plantar fasciitis is:

A. Custom total contact casting

B. PRE-FABRICATED HEEL CUP OR ARCH SUPPORT (over-the-counter, $10-30) combined with stretching — equal effectiveness to expensive custom orthotics for most plantar fasciitis patients in the short-to-medium term (Pfeffer et al., 1999)

C. Always custom orthotics

D. No orthotics — stretching only

✓ Answer: B

💡 **Rationale & Explanation:**

Plantar fasciitis orthotics evidence: RCTs (including landmark Pfeffer 1999) show PREFAB orthotics + stretching = EQUAL to custom orthotics at 3 months. Reserve custom orthotics for: significant biomechanical abnormalities (severe pes planus/cavus), failed response to prefab after 8-12 weeks, occupational requirements. MOST EFFECTIVE COMBINATION: calf stretching + plantar fascia-specific stretch + prefab orthotic + activity modification ± night splint → resolves symptoms in ~80% of patients within 12 months.

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274. The 'hip abductor strengthening' for PFPS is effective because it addresses:

A. Ankle weakness

B. Excessive dynamic knee valgus from inadequate hip ER and abduction control — reducing the femoral internal rotation and adduction that causes the patella to track laterally

C. Patellar tendon length

D. Tibial torsion

✓ **Answer: B**

💡 **Rationale & Explanation:**

Hip strengthening for PFPS rationale: CHAIN: WEAK GLUTEUS MEDIUS → inadequate hip ER + abduction control during loading → HIP INTERNALLY ROTATES + ADDUCTS → DYNAMIC KNEE VALGUS → patella tracks LATERALLY relative to the trochlea → increased lateral patellar stress → PFPS. Multiple high-quality RCTs confirm: hip abductor + hip ER strengthening produces superior outcomes to quad-focused rehabilitation alone for PFPS. EXERCISES: sidelying abduction, clamshells, hip hike, lateral band walk, single-leg squat with hip control.

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275. 'Aquatic therapy using the Halliwick concept' is specifically designed for:

A. Competitive swimming training

B. Teaching PEOPLE WITH DISABILITIES to achieve WATER INDEPENDENCE through a 10-point program — emphasizing disengagement from flotation aids and developing rotational control and balance in water

C. Cardiorespiratory conditioning in elite athletes

D. Deep water running for athletes

✓ Answer: B

💡 **Rationale & Explanation:**

Halliwick concept (James McMillan, 1949): 10-point program: Mental adjustment → Disengagement → Transverse rotation control → Sagittal rotation control → Longitudinal rotation control → Combined rotation control → Upthrust → Balance in stillness → Turbulent gliding → Simple progression. KEY PRINCIPLE: water INDEPENDENCE — teach using water's properties (buoyancy, turbulence, resistance) WITHOUT flotation aids. Applications: CP, MS, SCI, stroke, ABI, and anyone with neuromotor disabilities. Used in Philippine PT programs for aquatic rehabilitation of disabled populations.

├— ORTHOPEDIC ASSESSMENT

276. The 'posterior apprehension test' for posterior shoulder instability applies:

A. Anterior force to the humeral head

B. A POSTERIOR FORCE to the humerus with the arm at 90° forward flexion and internal rotation — positive when the patient shows apprehension or the humeral head subluxes posteriorly

C. Maximum abduction

D. Downward traction

✓ Answer: B

💡 **Rationale & Explanation:**

Posterior shoulder apprehension test: patient supine. Arm at 90° forward flexion, elbow at 90°. Examiner applies POSTERIOR DIRECTED

FORCE along the long axis of the humerus (pushing humeral head posteriorly in the glenoid) while maintaining 90° flexion + IR. POSITIVE: apprehension or actual posterior subluxation. JERK TEST: arm 90° flex + IR; apply axial compression while horizontally adducting → palpable clunk as posterior capsule subluxes. REHABILITATION: posterior rotator cuff strengthening; AVOID sleeper stretch in posterior instability (would further destabilize the posterior capsule).

ORTHOPEDIC REHABILITATION

277. The 'postural correction' for upper crossed syndrome includes:

A. Pectoral strengthening

B. Deep cervical flexor activation (longus colli/capitis), thoracic extension mobilization and strengthening, and scapular retraction (lower/middle trapezius) — addressing Janda's upper crossed syndrome pattern

C. Only neck stretching

D. Only shoulder strengthening

✓ Answer: B

💡 Rationale & Explanation:

Upper crossed syndrome correction: JANDA'S PATTERN: TIGHT = upper trapezius + levator scapulae + pectoralis major/minor. WEAK = deep cervical flexors + lower/middle trapezius + serratus anterior. EXERCISES: 1) DCF TRAINING: CCFT-guided chin tuck activating longus colli; 2) THORACIC MOBILIZATION: extension over foam roller; thoracic facet mobilization; 3) SCAPULAR RETRACTION: prone T and Y; seated rows; 4) PECTORAL STRETCHING: doorway stretch. Addressing ALL four components simultaneously produces better outcomes than any single element alone.

ORTHOPEDIC ASSESSMENT

278. The 'active compression test' (O'Brien's test) for SLAP tears — positive when:

A. External rotation relieves pain

B. The THUMB-DOWN position (full IR, 90° shoulder flexion, 15° horizontal adduction, resisted downward pressure) reproduces DEEP SHOULDER PAIN that is RELIEVED when the same test is repeated with the THUMB UP (ER/supination)

C. Pain worsens with supination

D. Anterior apprehension is elicited

✓ Answer: B

💡 **Rationale & Explanation:**

O'Brien's test: SETUP: arm at 90° forward flexion, 15-20° horizontal adduction. TEST 1: forearm PRONATED, thumb DOWN. Apply DOWNWARD FORCE. TEST 2: forearm SUPINATED, thumb UP. POSITIVE FOR SLAP: DEEP shoulder pain in thumb-down, REDUCED or ABSENT in thumb-up. Mechanism: thumb-down stresses the superior labral biceps attachment; thumb-up decompresses this stress. POSITIVE FOR AC JOINT: SUPERIOR shoulder pain in thumb-down, reduced with thumb-up. LOCATION of pain (deep inside vs. on top) distinguishes SLAP from AC joint pathology.

├— ORTHOPEDIC REHABILITATION

279. The 'Return to throwing' criteria after UCL reconstruction (Tommy John):

A. 3 weeks post-op

B. Typically 12-18 months post-op after achieving: full elbow ROM, strength ≥90% LSI, normal throwing mechanics, completing the ITP (Interval Throwing Program), pain-free at each stage — the UCL graft requires time to ligamentize (mature) before tolerating throwing forces

C. 6 months post-op

D. When pain-free at rest only

✓ **Answer: B**

💡 **Rationale & Explanation:**

UCL reconstruction RTS timeline: UCL graft LIGAMENTIZATION (maturation to full ligamentous tissue) requires 12-18 months. CRITERIA: full pain-free elbow ROM (0-135°+); UCL elbow valgus stress stability; grip strength ≥90% LSI; successfully completed ITP (starting at 45 feet, progressing to 60'6''); pain-free and mechanics-confirmed throwing at all stages; throwing biomechanics normal on video analysis; full confidence. The LENGTH of UCL rehabilitation is the primary reason 'Tommy John' is such a significant career event for overhead athletes.

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280. The 'resistance training first, then cardio' order for concurrent training is recommended because:

A. Cardio first is easier

B. Performing resistance training first avoids the CONCURRENT TRAINING INTERFERENCE EFFECT — the AMPK pathway activated by prior aerobic exercise antagonizes the mTOR anabolic pathway needed for hypertrophy; resistance training first does not significantly inhibit subsequent aerobic adaptations

C. Random order has no effect

D. Cardio training never interferes

✓ **Answer: B**

💡 **Rationale & Explanation:**

Concurrent training sequence: MOLECULAR: aerobic exercise → AMPK activation (energy conservation signal) → inhibits mTOR (anabolic signaling required for muscle protein synthesis). If aerobic is done FIRST, the mTOR response to subsequent resistance training is BLUNTED → reduced hypertrophy and strength gains. RESISTANCE FIRST, then aerobic: resistance training doesn't significantly inhibit aerobic adaptations. CLINICAL APPLICATION: for most patients,

combined exercise benefits outweigh interference; sequence resistance before aerobic when maximizing strength gains is a priority.

S3
Clinical Sciences II: Neurological Physical Therapy
Neurology, Stroke, SCI, Pediatrics & Balance

STROKE REHABILITATION

1. The Brunnstrom stages of motor recovery after stroke describe movement recovery from:

A. Flaccidity → spasticity → voluntary synergies → more selective movement → normal

B. Hypertonicity → flaccidity → synergies → selective movement

C. Spasticity throughout all stages with decreasing intensity

D. Only lower extremity recovery with 6 stages

✓ Answer: A

💡 Rationale & Explanation:

Brunnstrom's 7 stages of motor recovery: Stage 1 = Flaccidity; Stage 2 = Spasticity appears, beginning of synergy; Stage 3 = Spasticity peaks, voluntary movement in synergy only; Stage 4 = Spasticity decreasing, some movement outside synergy; Stage 5 = More independent movement; Stage 6 = Isolated joint movement possible; Stage 7 = Normal. Key concept: recovery goes flaccid → spastic → synergy-bound → selective → near-normal. UE flexion synergy includes shoulder ER, elbow flex, wrist flex. UE extension synergy includes shoulder adduction/IR, elbow extension.

2. Constraint-Induced Movement Therapy (CIMT) is indicated for:

A. Patients in the acute phase (first 72 hours) of stroke

B. Patients with chronic stroke who have SOME wrist/finger extension ability (≥10° wrist extension)

C. Patients with complete flaccid hemiplegia

D. Patients with Brunnstrom Stage 1 (flaccidity)

✓ Answer: B

💡 **Rationale & Explanation:**

CIMT: the unaffected arm is CONSTRAINED (mitt or sling) while the patient intensively uses the affected arm (6 hours/day for 2 weeks). The theory: overcome 'learned non-use' — after stroke, patients learn to compensate with the good arm. Eligibility criteria: wrist extension ≥10°, finger extension ≥10°, no severe spasticity, no significant balance/safety issues. NOT for flaccid patients. Best evidence: chronic stroke (>6 months). This is a high-yield topic on current PT boards.

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3. A stroke patient with LEFT hemisphere lesion would MOST commonly present with:

A. Left hemiplegia and left visual field cut

B. Right hemiplegia, aphasia, and ideomotor apraxia

C. Right hemiplegia and left spatial neglect

D. Left hemiplegia, depression, and impulsive behavior

✓ Answer: B

💡 **Rationale & Explanation:**

Left hemisphere stroke: RIGHT-sided hemiplegia/hemiparesis; Aphasia (Broca's, Wernicke's, or global — language in left hemisphere in most right-handers); Ideomotor apraxia (can't perform learned movements on command despite ability and comprehension); Right visual field cut; Depression. Right hemisphere stroke: LEFT-sided hemiplegia; LEFT spatial neglect; Visuospatial deficits; Impulsive behavior; Denial of disability (anosognosia). Right hemisphere patients are often MORE difficult to rehabilitate due to neglect and impulsivity.

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4. The Modified Ashworth Scale (MAS) is used to assess:

A. Voluntary strength of spastic muscles

B. Resistance to passive movement (tone/spasticity)

C. Functional ambulation in stroke patients

D. Balance and coordination deficits

✓ Answer: B

💡 **Rationale & Explanation:**

Modified Ashworth Scale (MAS) grades resistance to PASSIVE MOVEMENT as a measure of muscle tone/spasticity: 0 = No increase in tone; 1 = Slight increase, catch and release at end of range; 1+ = Catch and minimal resistance through <50% of range; 2 = Marked increase through most of range; 3 = Considerable increase, passive movement difficult; 4 = Affected part rigid. It measures resistance to PASSIVE movement — not voluntary strength (that's MMT). MAS is used in stroke, TBI, CP, and SCI to track spasticity changes.

├─ NEUROLOGICAL ASSESSMENT

5. The Romberg test assesses:

A. Cerebellar function through heel-to-shin coordination

B. Proprioceptive/vestibular contribution to balance (standing with eyes open vs. eyes closed)

C. Cortical function through dual-task performance

D. Basal ganglia function through rhythmic movement

✓ Answer: B

💡 **Rationale & Explanation:**

Romberg test: patient stands with feet together, arms at sides. Eyes open first — if can't maintain balance with eyes open, cerebellum or proprioception is severely impaired. Then eyes closed. Positive Romberg = maintains balance with eyes open but SWAYS or FALLS with eyes closed. Rationale: eyes closed removes visual input, exposing a

deficit in proprioceptive or vestibular balance. Positive = peripheral neuropathy, dorsal column lesion, vestibular disorder. NEGATIVE Romberg with ataxia = cerebellar disorder — distinguishes cerebellar from sensory ataxia.

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6. The Functional Independence Measure (FIM) consists of:

A. 10 items: 5 motor, 5 cognitive

B. 18 items: 13 motor, 5 cognitive

C. 20 items: 15 motor, 5 cognitive

D. 18 items: 10 motor, 8 cognitive

✓ Answer: B

💡 **Rationale & Explanation:**

The FIM has 18 items total: 13 MOTOR items (self-care: eating, grooming, bathing, dressing UE/LE, toileting; Sphincter: bladder/bowel management; Transfers: bed/chair, toilet, tub/shower; Locomotion: walk/wheelchair, stairs) and 5 COGNITIVE items (Comprehension, Expression, Social interaction, Problem solving, Memory). Each item scored 1-7 (1 = total assist, 7 = complete independence). Total = 18-126. It's the MOST widely used rehabilitation outcome measure in inpatient rehab.

├— PEDIATRIC NEUROLOGY

7. Cerebral palsy (CP) topographic classification — diplegia primarily involves:

A. One side of the body (hemiplegia)

B. Both lower extremities, with minimal upper extremity involvement

C. All four extremities equally (tetraplegia)

D. One limb only (monoplegia)

✓ Answer: B

💡 **Rationale & Explanation:**

CP topographic classification: Hemiplegia = one side (arm and leg, same side — UE typically worse); Diplegia = primarily BOTH LOWER EXTREMITIES with mild-moderate UE involvement (classic premature infant pattern); Quadriplegia/Tetraplegia = all four limbs severely affected; Monoplegia = one limb. Diplegia is the MOST COMMON form of spastic CP and strongly associated with periventricular leukomalacia (PVL) in premature infants. The corticospinal fibers serving the legs run close to the lateral ventricles (damaged in PVL), explaining the leg-dominant pattern.

BALANCE & VESTIBULAR

8. Benign paroxysmal positional vertigo (BPPV) is caused by:

A. Inflammation of the vestibular nerve (vestibular neuritis)

B. Displacement of otoconia (calcium carbonate crystals) into the semicircular canals

C. Endolymphatic hydrops causing fluid buildup in the inner ear

D. Vascular insufficiency in the posterior circulation

✓ Answer: B

💡 Rationale & Explanation:

BPPV is the most common vestibular disorder and cause of vertigo overall. The otoconia (calcium carbonate crystals normally in the utricle's otolithic membrane) become dislodged and fall into the semicircular canals — most commonly the POSTERIOR canal (85-90%). When the head moves, the crystals move and deflect the cupula, creating false rotational signals → vertigo + nystagmus. Hallmark: brief (seconds), position-triggered vertigo. Diagnosis: Dix-Hallpike test. Treatment: Epley maneuver (>80% success rate). THE most-tested vestibular topic on Philippine PT boards.

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9. The Dix-Hallpike test is POSITIVE (posterior canal BPPV) when:

A. Patient reports dizziness only without nystagmus

B. Upbeat-torsional nystagmus with latency, limited duration, and fatigability is observed after head positioning

C. Pure vertical downbeat nystagmus appears immediately on positioning

D. Nystagmus persists continuously for >1 minute

✓ Answer: B

💡 **Rationale & Explanation:**

Dix-Hallpike test: patient sits, turn head 45° to one side, quickly lower to supine with head hanging ~20-30° below horizontal. Watch the eyes! Positive (posterior canal BPPV): upbeat-TORSIONAL nystagmus with 3-5 second LATENCY, duration <60 seconds, and FATIGUES with repeated testing. The fatigability distinguishes benign from central causes. Central nystagmus: immediate onset, doesn't fatigue, may be purely vertical, persists >1 min → MRI required.

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10. The Epley maneuver for posterior canal BPPV involves:

A. 4 head-turning positions designed to move otoconia out of the posterior canal back into the utricle

B. Brandt-Daroff habituation exercises repeated 3x/day

C. Pushing the otoconia deeper into the canal to reduce symptoms

D. Rapid 360° head rotations to flush the canal

✓ Answer: A

💡 **Rationale & Explanation:**

Epley maneuver: 4 sequential head positions, each held 30 seconds, to guide the displaced otoconia out of the POSTERIOR canal → around the posterior canal arc → through the common crus → back into the utricle. Steps: 1) Dix-Hallpike position (affected side down); 2) Roll head 90° to opposite side; 3) Roll body/head further until face-down 45°; 4) Sit up slowly. Completed in 5 minutes with ~80-90% success rate in one session. After the Epley, no overnight restrictions are evidence-supported.

├— SPINAL CORD INJURY

11. A patient with complete C6 SCI has which PRESERVED function?

A. Hand intrinsic function and finger flexion

B. Wrist extension (ECRL) and shoulder function — can use tenodesis grasp

C. Elbow extension and triceps function

D. Independent ambulation with AFOs

✓ Answer: B

💡 Rationale & Explanation:

C6 complete SCI: PRESERVED = C1-C6 functions. C6 innervates: wrist extensors (ECRL/ECRB), biceps (C5-C6), deltoid (C5-C6). LOST = triceps (C7), hand intrinsics (C8-T1), finger flexors/extensors. Functional implication: C6 patients can use TENODESIS GRASP — wrist EXTENSION causes fingers to passively flex, creating a functional grip. They can propel a manual wheelchair, perform ADLs with adaptive equipment, drive with hand controls. C6 is a pivotal injury level — know the functional expectations!

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12. Autonomic dysreflexia is a life-threatening complication seen in SCI ABOVE which spinal level?

A. L2

B. T10

C. T6

D. C8

✓ Answer: C

💡 Rationale & Explanation:

Autonomic dysreflexia (AD) occurs in injuries at or ABOVE T6 (the major sympathetic outflow). A noxious stimulus BELOW the injury level (bladder distension — #1 cause, bowel impaction, pressure ulcer) triggers massive sympathetic discharge. Signs: sudden SEVERE HYPERTENSION (SBP may rise >150-200 mmHg), pounding headache,

profuse sweating and flushing ABOVE injury level, bradycardia, goosebumps. Treatment: SIT THE PATIENT UP, find and remove the cause (check foley catheter first — drain the bladder!). T6 is the magic level because above T6, sympathetics can't be regulated by descending control.

NEUROLOGICAL REHABILITATION

13. Task-specific training in neurological rehabilitation is based on which motor learning principle?

A. Blocked practice with identical repetition

B. Random practice in multiple contexts promoting better retention and transfer

C. Therapist-guided passive movement to form muscle memory

D. Mental imagery without physical practice

✓ Answer: B

💡 **Rationale & Explanation:**

Task-specific, random practice (contextual interference) produces BETTER LONG-TERM RETENTION and TRANSFER of motor skills than blocked practice. Practicing multiple tasks in a random order forces the motor system to reconstruct the motor plan each repetition — more cognitive effort, better learning. Blocked practice may look better DURING training (performance), but random practice is superior AFTER training (learning). Application in neurological PT: vary the task to promote true motor learning — practice transfers from different chair heights, different directions.

NEUROLOGICAL ASSESSMENT

14. In the Glasgow Coma Scale (GCS), the maximum score indicating full consciousness is:

A. 15

B. 12

C. 18

D. 10

✓ Answer: A

💡 **Rationale & Explanation:**

Glasgow Coma Scale (GCS) maximum = 15 (fully conscious). Minimum = 3 (deeply unconscious). Three domains: Eye Opening (1-4): 4=spontaneous, 3=to voice, 2=to pain, 1=none; Verbal Response (1-5): 5=oriented, 4=confused, 3=words, 2=sounds, 1=none; Motor Response (1-6): 6=obeys commands, 5=localizes, 4=withdraws, 3=abnormal flexion/decorticate, 2=extension/decerebrate, 1=none. GCS ≤8 = SEVERE TBI. GCS 9-12 = MODERATE TBI. GCS 13-15 = MILD TBI.

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15. Pusher syndrome after stroke is characterized by:

A. Patient leans and pushes toward the NON-HEMIPLEGIC side

B. Patient falls toward the hemiplegic side during transfers

C. Patient pushes toward the hemiplegic side with the intact limbs, resisting attempts to correct posture

D. Patient is unable to perceive midline orientation

✓ Answer: C

💡 **Rationale & Explanation:**

Pusher syndrome: patient ACTIVELY PUSHES their body TOWARD THE HEMIPLEGIC SIDE using the intact limbs — the healthy arm and leg actively push the body into the weak side. They RESIST corrections toward upright. The body's subjective perception of vertical (thalamic injury) is rotated toward the hemiplegic side. Management: use VISUAL feedback as the primary sensory reference (visual vertical is preserved). Stand the patient in front of a mirror, use floor tiles and doorframes as visual references. Pusher syndrome significantly delays rehabilitation.

PARKINSON'S DISEASE

16. The LSVT-BIG program for Parkinson's disease is characterized by:

A. Small, controlled, precise movements to conserve energy

B. HIGH AMPLITUDE (big) movements using intensive practice to recalibrate the patient's movement perception

C. Passive stretching and relaxation techniques for rigidity

D. Aquatic therapy for fall prevention only

✓ Answer: B

💡 Rationale & Explanation:

LSVT-BIG: intensive (16 sessions in 4 weeks, 4x/week), HIGH AMPLITUDE movement training for Parkinson's patients. The core problem in PD: bradykinesia + hypokinesia (small, slow movements). PD patients 'feel normal' when actually moving SMALL. LSVT-BIG trains patients to generate EXAGGERATED, BIG movements and recalibrate their internal movement sense. Evidence: improved gait speed, stride length, balance, and ADL performance vs. conventional PT. Think: 'BIG movements = small disease impact.'

MULTIPLE SCLEROSIS

17. In multiple sclerosis rehabilitation, the Uhthoff phenomenon refers to:

A. Temporary worsening of MS symptoms with increased body temperature

B. Permanent neurological deterioration after a relapse

C. Spontaneous improvement in symptoms during remission

D. Fatigue caused by demyelination of the reticular formation

✓ Answer: A

💡 Rationale & Explanation:

Uhthoff phenomenon: temporary WORSENING of MS symptoms with increased body temperature (fever, hot bath, exercise). The mechanism: demyelinated axons are particularly sensitive to temperature increases — even a 0.5°C rise slows/blocks conduction. Symptoms return to baseline when temperature normalizes. This is NOT a true relapse — it's a pseudo-relapse. Clinical implication for PT: use cooling strategies (cooling vests, cold drinks, fan, air conditioning). Exercise is STILL RECOMMENDED for MS — just use cooling precautions.

NEUROLOGICAL REHABILITATION

18. Mirror therapy for phantom limb pain or post-stroke upper extremity rehab works through:

A. Strengthening the affected limb directly

B. Providing visual feedback of movement that tricks the brain into perceiving normal movement in the affected limb

C. Proprioceptive input to the phantom or paretic limb

D. Reducing cortical excitability through visual suppression

✓ Answer: B

💡 Rationale & Explanation:

Mirror therapy: a mirror is placed vertically between the patient's arms. The patient watches the reflection of the INTACT limb moving — the brain receives visual feedback that LOOKS like the affected/phantom limb is moving normally. In phantom limb pain — tricks the motor cortex into 'seeing' successful movement of the phantom, disrupting the pain memory. In stroke — re-activates the affected hemisphere's motor cortex through mirror neurons. Evidence: moderate-good for reducing phantom limb pain and improving post-stroke hand function.

NEUROLOGICAL ASSESSMENT

19. The Fugl-Meyer Assessment (FMA) is used to measure:

A. Spasticity in all four extremities in stroke

B. Sensorimotor impairment in post-stroke upper and lower extremity

C. Functional walking in acute stroke

D. Cognitive function and ADL independence

✓ Answer: B

💡 **Rationale & Explanation:**

Fugl-Meyer Assessment (FMA): the gold-standard measure of sensorimotor IMPAIRMENT after stroke. It assesses: UE motor function (33 items, 66 points), LE motor function (17 items, 34 points), balance (7 items, 14 points), sensation (12 items, 24 points), and joint ROM/pain (24 items, 44 points). It follows Brunnstrom's recovery stages — synergistic movements scored before selective movements. The FMA is the most cited outcome measure in stroke rehab research and is considered the criterion standard for motor impairment.

PEDIATRIC NEUROLOGY

20. The Gross Motor Function Classification System (GMFCS) for cerebral palsy classifies children into 5 levels based on:

A. Cognitive ability and communication

B. Self-initiated movement with emphasis on sitting, transfers, and mobility

C. Fine motor skills and activities of daily living

D. Speech and language function

✓ Answer: B

💡 **Rationale & Explanation:**

GMFCS: 5-level classification of functional motor ability in CP. Level I = walks without restrictions, limitations only in advanced skills; II = walks with limitations; III = walks with assistive device; IV = self-mobility with limitations (powered wheelchair); V = severely limited self-mobility. The GMFCS is highly predictive of adult mobility — a child at GMFCS Level V is unlikely to walk as an adult. It guides PT goal-setting and equipment prescription. Know all 5 levels — tested on every board exam cycle in the Philippines.

TRAUMATIC BRAIN INJURY

21. Diffuse axonal injury (DAI) in traumatic brain injury is caused by:

A. Direct contusion of the frontal lobe

B. Rotational and shear forces causing widespread axonal disruption throughout the brain

C. Localized hemorrhage in the basal ganglia

D. Hypoxia due to respiratory failure after TBI

✓ Answer: B

💡 **Rationale & Explanation:**

Diffuse axonal injury (DAI): occurs due to ROTATIONAL ACCELERATION-DECELERATION forces (like in car accidents, shaken baby syndrome) that cause SHEAR stress on axons throughout the brain — especially at junctions between white and grey matter and in the corpus callosum, brainstem, and internal capsule. DAI is the most common cause of persistent vegetative state. It's NOT a localized contusion — the diffuse nature means global cognitive and motor deficits, not focal deficits.

NEUROLOGICAL REHABILITATION

22. Functional electrical stimulation (FES) for drop foot in stroke is used to:

A. Strengthen the gastrocnemius during the swing phase

B. Stimulate the tibialis anterior and peroneals during swing phase to dorsiflex the foot and clear the toe

C. Reduce spasticity in the plantar flexors

D. Provide sensory feedback to the damaged motor cortex

✓ Answer: B

💡 **Rationale & Explanation:**

FES for drop foot: electrodes placed over the common peroneal nerve or tibialis anterior. A heel switch triggers stimulation DURING SWING PHASE — the electrical current contracts the dorsiflexors, lifting the foot to clear the toe. Without FES, the foot drops during swing, causing the patient to either hike the hip, circumduct, or vault — compensatory gait patterns that increase fall risk and energy expenditure. FES provides both orthotic (immediate) and THERAPEUTIC (neuroplasticity-promoting) effects.

├— SPINAL CORD INJURY

23. Heterotopic ossification (HO) in SCI presents with:

A. Pathological fractures due to osteoporosis below the lesion

B. Ectopic bone formation in soft tissues below the lesion, causing pain, heat, swelling, and ROM loss

C. Calcification of peripheral nerves causing sensory loss

D. Avascular necrosis of the femoral head

✓ Answer: B

💡 **Rationale & Explanation:**

Heterotopic ossification (HO) in SCI: abnormal bone formation in SOFT TISSUES (muscle, connective tissue) typically BELOW the injury level. Most common sites: hip, knee, elbow, shoulder. Presentation: swelling, warmth, loss of ROM (often the FIRST sign), low-grade fever, elevated alkaline phosphatase. Onset: 1-4 months post-injury. Treatment: gentle

ROM maintained (not aggressive stretching through pain), NSAIDs, bisphosphonates, surgical resection only when mature (18-24 months). Aggressive forceful stretching can WORSEN HO — be gentle!

NEUROLOGICAL REHABILITATION

24. Body weight-supported treadmill training (BWSTT) for incomplete SCI or stroke uses partial unloading to:

A. Completely eliminate ground reaction forces for pain-free walking

B. Provide the spinal cord with rhythmic locomotor training while reducing fall risk, promoting locomotor pattern recovery through CPG activation

C. Facilitate tone reduction in spastic plantar flexors

D. Train upper extremity coordination

✓ Answer: B

💡 **Rationale & Explanation:**

BWSTT: overhead harness suspends 10-40% of body weight while the patient walks on a treadmill. Scientific basis: the CENTRAL PATTERN GENERATOR (CPG) — a spinal cord network in the lumbar region that can produce rhythmic locomotor patterns even without supraspinal input — is activated by rhythmic, task-specific weight-bearing locomotion. In incomplete SCI and stroke, BWSTT attempts to harness CPG activity to re-establish stepping patterns. Current evidence: strong for incomplete SCI; mixed but positive trends for stroke.

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25. The Rancho Los Amigos Level VII (Automatic-Appropriate) patient is characterized by:

A. No response to stimulation

B. Confused-agitated, unable to follow commands

C. Alert, oriented, but robot-like — follows routine but struggles with novel situations and community reintegration

D. Fully purposeful, appropriate in all settings

✓ **Answer: C**

💡 **Rationale & Explanation:**

Rancho Los Amigos LCOF: Level VII = Automatic-Appropriate. Patient appears 'recovered' — alert, oriented, follows routine hospital activities well — but is ROBOT-LIKE: can't handle novel situations, community reintegration is limited, memory for new learning is impaired. Level VIII = Purposeful-Appropriate (independent in familiar environments, may have residual higher-level deficits). Level VII patients look recovered but struggle in community settings — a classic trap in both clinic and boards. They need cognitive strategy training and community reintegration programs.

SPINAL CORD INJURY

26. Spinal shock following acute SCI refers to:

A. Immediate death of spinal cord tissue

B. Transient suppression of all spinal cord activity below the lesion level

C. Hemodynamic instability following SCI

D. Autonomic dysreflexia in the acute phase

✓ **Answer: B**

💡 **Rationale & Explanation:**

Spinal shock is the transient SUPPRESSION of all spinal cord reflexes BELOW the level of injury, occurring immediately after acute SCI. During spinal shock: flaccid paralysis, absent reflexes, urinary retention. It lasts hours to weeks (average 4-12 weeks). Resolution is marked by the RETURN of the BULBOCAVERNOSUS REFLEX. Once spinal shock resolves, the true level and completeness of injury can be determined. After spinal shock, UMN signs develop (spasticity, hyperreflexia) if injury is above the conus.

NEUROLOGICAL REHABILITATION

27. In the treatment of spasticity, rhythmic stabilization PNF technique aims to:

A. Increase muscle strength through heavy resistance

B. Reduce spasticity and improve co-contraction by applying alternating resistance to agonist and antagonist groups with no joint movement

C. Stretch spastic muscles at end-range with manual resistance

D. Facilitate mass extension synergy for gait preparation

✓ Answer: B

💡 **Rationale & Explanation:**

Rhythmic stabilization (RS): therapist applies ALTERNATING ISOMETRIC resistance to agonist then antagonist groups — NO joint movement occurs. The rapid alternation promotes co-contraction and may reduce tone. In spastic patients, RS is used to: improve proximal trunk/shoulder/hip stability; reduce spasticity through reciprocal neural inhibition. It's different from agonist contraction or slow reversal (which involve movement). RS is particularly useful for patients who can't control eccentric loading or for early-stage rehabilitation.

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28. The Carr and Shepherd Motor Relearning Programme (MRP) is grounded in:

A. Reflex-hierarchy model — reflexes must be inhibited before voluntary movement

B. Systems theory and motor learning — practice of specific functional tasks with augmented feedback

C. Facilitation of mass synergy patterns before selective movement

D. Progressive passive mobilization before active exercise

✓ Answer: B

💡 **Rationale & Explanation:**

Carr and Shepherd's Motor Relearning Programme (MRP) is based on contemporary motor control/systems theory and motor learning principles. Key elements: 1) Task analysis — identify what the patient CAN'T do (missing components); 2) Practice of the missing components; 3) Practice of the whole task; 4) Transfer of training. It's TASK-ORIENTED and emphasizes ACTIVE patient participation, repetitive practice, and use of meaningful functional tasks. Augmented feedback (verbal, visual, biofeedback) guides learning. Strong evidence base.

NEUROLOGICAL ASSESSMENT

29. A patient with diabetic peripheral neuropathy — the EARLIEST symptom is typically:

A. Muscle weakness in the lower extremities

B. Autonomic dysfunction (orthostatic hypotension)

C. Loss of vibration and proprioception in the toes (large fiber)

D. Burning, tingling pain in a stocking-glove distribution (small fiber)

✓ Answer: D

💡 **Rationale & Explanation:**

Diabetic peripheral neuropathy typically starts with SMALL FIBER involvement — burning, tingling, and lancinating pain in a 'stocking-glove' distribution (feet and hands, longest nerves affected first — length-dependent neuropathy). This is the earliest and most common symptom. Large fiber loss (vibration, proprioception, reflexes) comes later. PT relevance: sensory deficits → impaired protective sensation → foot ulcers → amputation. Teach daily foot inspection, appropriate footwear, and balance training. Screen with monofilament testing (5.07 = 10g Semmes-Weinstein filament).

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30. Charcot joint (neuropathic arthropathy) is most commonly seen in patients with:

A. Rheumatoid arthritis

B. Diabetes mellitus (diabetic neuropathy)

C. Ankylosing spondylitis

D. Systemic lupus erythematosus

✓ Answer: B

💡 **Rationale & Explanation:**

Charcot joint develops when LOSS OF PROTECTIVE SENSATION allows repeated microtrauma to destroy a joint without pain awareness. The joint becomes progressively deformed — warm, swollen, and eventually grossly deformed ('bag of bones'). In diabetes, peripheral neuropathy removes the pain signal, and the foot joints bear the brunt. The midfoot arch collapses into a 'rocker-bottom' foot. PT relevance: TOTAL CONTACT CASTING, offloading, and custom orthotics are critical. The Charcot foot in acute phase needs offloading — NEVER mobilize aggressively.

├— STROKE REHABILITATION

31. In stroke rehabilitation, 'learned non-use' is overcome by:

A. Passive range of motion of the affected limb

B. Constraint-Induced Movement Therapy (CIMT) — restraining the unaffected arm to force use of the affected arm

C. Strengthening only the unaffected side

D. Bilateral arm training in the water

✓ Answer: B

💡 **Rationale & Explanation:**

Learned non-use: after stroke, patients quickly learn that trying to use the affected arm is difficult, frustrating, and unsuccessful. The brain 'learns' not to use it — and this learned avoidance persists even after the motor system partially recovers. CIMT directly challenges this by CONSTRAINING the good arm (mitt/sling) and INTENSIVELY forcing use

of the affected arm. This intensive use drives cortical reorganization (neuroplasticity) — expanding the cortical representation of the affected hand. CIMT requires: wrist extension ≥10°, finger extension ≥10°, no severe spasticity. The intensive repetition and task-specific training are the active ingredients of CIMT.

SPINAL CORD INJURY

32. The neurological level of a SCI is defined as:

A. The vertebral level of the bony fracture

B. The MOST CAUDAL (lowest) segment of the spinal cord with NORMAL sensory AND motor function bilaterally

C. The highest level with complete motor function

D. The level of the vertebral fracture on X-ray

✓ Answer: B

💡 **Rationale & Explanation:**

Neurological Level of Injury (NLI): the most CAUDAL (lowest, farthest from brain) spinal cord SEGMENT that has NORMAL sensory AND motor function on BOTH sides. This is based on testing 28 dermatomes (sensory) and 10 key muscle groups (motor) on each side. Importantly: the neurological level may NOT correspond to the vertebral fracture level. The spinal cord ends at L1-L2 (conus medullaris), so injuries below L2 affect the cauda equina (nerve roots), not the cord itself. The American Spinal Injury Association (ASIA) worksheet standardizes this assessment — essential for SCI classification and communication.

NEUROLOGICAL ASSESSMENT

33. The Timed Up and Go (TUG) test measures:

A. Upper extremity coordination

B. Balance and basic functional mobility — time to rise from a chair, walk 3 meters, turn, and return to the chair

C. Endurance during prolonged walking

D. Cognitive function during dual-task performance

✓ Answer: B

💡 **Rationale & Explanation:**

TUG test: patient rises from a standard chair, walks 3 meters to a marker, turns around, walks back, and sits down. TIME recorded in seconds. Normal healthy elderly: <12 seconds. Increased fall risk: >13.5 seconds. TUG >20 seconds = significant fall risk, likely requires an assistive device. TUG correlates with gait speed, balance, and fall history. It's the most widely used quick clinical measure of functional mobility. The DUAL-TASK TUG (counting backward while doing TUG) is even more sensitive for fall risk — cognitive-motor dual-task interference reveals central processing limitations. Use the TUG routinely in all elderly patients.

NEUROLOGICAL REHABILITATION

34. The neuroplasticity principle 'use it or lose it' means in PT practice:

A. If a patient stops exercising, they will get worse

B. Neural circuits and cortical representations that are NOT used diminish over time; those that ARE used strengthen and expand

C. Only acute injuries benefit from early mobilization

D. Patients must exercise daily or gains are lost within 24 hours

✓ Answer: B

💡 **Rationale & Explanation:**

Neuroplasticity principle 'Use it or lose it': cortical representations of body parts and functions SHRINK when they're not used (like a neglected muscle atrophies). Conversely, 'Use it and improve it' — intensive, task-specific practice expands cortical representations and strengthens neural pathways. In stroke rehab: the affected limb's

cortical area SHRINKS if not used (reinforced by learned non-use); CIMT and intensive training EXPAND the affected limb's cortical representation. Same for sensory input — sensory deprivation shrinks sensory cortex representations. This is why early, intensive, repetitive, task-specific rehabilitation is superior to passive, low-repetition therapy in neurological conditions.

NEUROLOGICAL ASSESSMENT

35. The Barthel Index is used to assess:

A. Spasticity in stroke patients

B. Activities of daily living (ADL) independence in stroke and neurological patients

C. Cognitive function after TBI

D. Balance during community ambulation

✓ Answer: B

💡 **Rationale & Explanation:**

Barthel Index: one of the oldest and most widely used measures of ACTIVITIES OF DAILY LIVING (ADL) independence. It assesses 10 activities: feeding, bathing, grooming, dressing, bowel control, bladder control, toilet use, transfers (bed-chair), mobility (walking or wheelchair), and stair climbing. Total score: 0-100 (100 = fully independent). Scores: 0-20 = total dependence; 21-60 = severe dependence; 61-90 = moderate dependence; 91-99 = slight dependence; 100 = independent. Note: a Barthel score of 100 does NOT mean the patient is living independently in the community — it just means they can perform these specific ADLs. The FIM is more sensitive to change than the Barthel.

PEDIATRIC NEUROLOGY

36. In cerebral palsy management, selective dorsal rhizotomy (SDR) is indicated for:

A. All children with CP regardless of functional level

B. Children with GMFCS Level I-III spastic diplegia with good strength and selective motor control but functional limitation from spasticity

C. Children with dystonic CP only

D. Adults with long-standing CP contractures

✓ Answer: B

💡 **Rationale & Explanation:**

Selective Dorsal Rhizotomy (SDR): a surgical procedure where sensory nerve rootlets (dorsal roots, L1-S1) contributing to spasticity are selectively CUT, permanently reducing spasticity in the lower extremities. Best candidates: SPASTIC DIPLEGIA, GMFCS Level I-III, adequate underlying muscle strength (spasticity is masking potential function), normal or near-normal cognition, good family support for intensive post-operative PT. SDR is NOT for dystonic CP (different mechanism), severe weakness (removing spasticity may reveal weakness), or GMFCS Level IV-V. Post-SDR PT is INTENSIVE — the patient must work hard to functionally use the newly available range of motion. Outstanding results in appropriate candidates.

NEUROLOGICAL ASSESSMENT

37. The 10-Meter Walk Test (10MWT) measures:

A. Functional endurance

B. Gait speed (comfortable and/or maximum)

C. Balance during community ambulation

D. Dual-task walking performance

✓ Answer: B

💡 **Rationale & Explanation:**

10-Meter Walk Test (10MWT): measures GAIT SPEED over 10 meters (typically using the middle 6 meters of a 10-meter course to exclude acceleration and deceleration phases). Measured at comfortable (self-selected) speed and/or maximum speed. Units: meters/second. Normal healthy elderly: ~1.2 m/s comfortable. Fall risk threshold: <0.8 m/s associated with limited community ambulation. Community ambulation threshold: ≥1.0 m/s. Clinical significance: gait speed is considered the 'sixth vital sign' — it predicts mortality, hospitalization, and functional decline in older adults. The 10MWT has excellent reliability and responsiveness to change. MCID ≈ 0.1 m/s for stroke.

NEUROLOGICAL REHABILITATION

38. The 'bilateral transfer' (cross-education) phenomenon in motor learning means:

A. Training is more effective when done bilaterally

B. Strength and motor skill training of ONE limb produces gains in the CONTRALATERAL (untrained) limb

C. Motor learning transfers from proximal to distal muscle groups

D. Skills learned in one context transfer to all other contexts

✓ Answer: B

💡 Rationale & Explanation:

Bilateral transfer (cross-education): when you train ONE side of the body, measurable strength and motor skill improvements occur in the OPPOSITE (contralateral, untrained) side. Mechanism: the cross-education effect is thought to occur via neural cross-activation — training activates bilateral cortical pathways, not just ipsilateral. Clinical application: in a patient with a limb in a cast or completely paralyzed limb (post-stroke), actively training the UNAFFECTED side may help maintain or even partially improve the affected side through cross-education. This is an evidence-based reason to train the unaffected limb vigorously even when the affected limb is immobilized or severely impaired.

39. In multiple sclerosis rehabilitation, energy conservation techniques include:

A. Performing all activities rapidly to minimize total time

B. Prioritizing activities, pacing, scheduling rest breaks, using adaptive equipment, and avoiding fatigue-inducing peak exertion

C. Complete bed rest during fatigue

D. Increasing exercise intensity to overcome fatigue

✓ Answer: B

💡 **Rationale & Explanation:**

MS fatigue is one of the MOST DEBILITATING symptoms of MS — affecting 80-90% of patients. Unlike normal fatigue, MS fatigue: occurs with minimal exertion, is not proportional to activity level, does not improve with rest in the same way, and is worsened by heat (Uhthoff). Energy conservation strategies: 1) PRIORITIZE activities (what is most important?); 2) PACE activities (alternate activity with rest, don't 'push through'); 3) Schedule demanding tasks during peak energy times (usually morning); 4) Use adaptive EQUIPMENT (wheeled walkers, reachers, shower chairs); 5) Environmental modifications (everything accessible, minimize unnecessary trips); 6) COOLING strategies (Uhthoff). Fatigue education is a cornerstone of MS PT management.

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40. Transcranial magnetic stimulation (TMS) is used in neurological rehabilitation research to:

A. Permanently destroy overactive neural circuits

B. Non-invasively map cortical function and temporarily modulate cortical excitability for research and therapeutic purposes

C. Replace neural tissue lost in stroke

D. Electrically stimulate peripheral muscles

✓ Answer: B

💡 **Rationale & Explanation:**

TMS uses pulsed magnetic fields delivered through a coil placed on the scalp to INDUCE ELECTRICAL CURRENTS in the cortex. Applications:

Cortical MAPPING (identify which brain areas control specific movements — used before neurosurgery); Cortical EXCITABILITY modulation: Repetitive TMS (rTMS) — low-frequency rTMS (1 Hz) DECREASES cortical excitability (used to suppress overactive areas, e.g., inhibit the unaffected hemisphere in stroke); high-frequency rTMS (10-20 Hz) INCREASES excitability (used to enhance the affected hemisphere in stroke). Used as both a RESEARCH TOOL and emerging THERAPEUTIC INTERVENTION in stroke, TBI, depression, and chronic pain. Growing evidence base in neurological rehabilitation.

├— STROKE REHABILITATION

41. In the rehabilitation of hemiplegic shoulder pain after stroke, which intervention has the STRONGEST evidence?

A. Complete shoulder immobilization in a sling

B. Functional electrical stimulation (FES) to the shoulder muscles + early positioning + range of motion exercises

C. Hot packs to the shoulder daily

D. Aggressive passive ROM to full range regardless of pain

✓ Answer: B

💡 **Rationale & Explanation:**

Hemiplegic shoulder pain (HSP) occurs in up to 72% of stroke patients. Best-evidence interventions: FUNCTIONAL ELECTRICAL STIMULATION (FES) to the supraspinatus and posterior deltoid during the flaccid phase — prevents subluxation and reduces pain (Grade A evidence). PROPER POSITIONING: support the flaccid arm at all times (arm trough on wheelchair, elevated when in bed) — prevents the weight of the arm from pulling the glenohumeral joint apart. GENTLE ROM within pain-free range. AVOID: aggressive PROM to full range (can cause impingement and CRPS Type I in a flaccid arm), forceful handling during transfers. SLING USE: controversial — supports the arm but may worsen learned non-use; use judiciously during ambulation only.

TRAUMATIC BRAIN INJURY

42. Post-traumatic amnesia (PTA) after traumatic brain injury is defined as:

A. Inability to recall events BEFORE the injury (retrograde amnesia)

B. The period of confusion and disorientation AFTER the injury during which the patient cannot form continuous memory

C. Permanent memory loss following TBI

D. Short-term memory loss lasting less than 30 minutes

✓ Answer: B

💡 Rationale & Explanation:

Post-traumatic amnesia (PTA): the period AFTER a TBI during which the patient is confused, disoriented, and UNABLE TO FORM CONTINUOUS MEMORIES (anterograde amnesia). The patient may be awake and talking but not forming new memories. Duration of PTA is a KEY PREDICTOR of TBI SEVERITY and functional outcome: PTA <1 hour = mild TBI; 1-24 hours = moderate; 1-7 days = severe; >7 days = very severe; >4 weeks = extremely severe. Measured with the WESTMEAD PTA SCALE or GALVESTON ORIENTATION AND AMNESIA TEST (GOAT). PT during PTA: low stimulation environment, simple commands, consistent routine, orientation cues. Patient in PTA cannot meaningfully participate in complex learning-based rehabilitation.

NEUROLOGICAL REHABILITATION

43. The 'tilt table' is used in PT for patients with orthostatic hypotension following prolonged bed rest or SCI. The goal of progressive tilt table use is:

A. To strengthen the hip flexors

B. To gradually recondition the cardiovascular system to upright posture, reduce orthostatic hypotension, and stimulate weight-bearing in non-ambulatory patients

C. To stretch the hamstrings passively

D. To assess balance in standing

✓ Answer: B

💡 **Rationale & Explanation:**

Tilt table use: a motorized table that gradually moves a patient from horizontal to vertical (upright) position in a controlled, incremental manner. Primary goals: 1) CARDIOVASCULAR RECONDITIONING — after prolonged bed rest or SCI, the autonomic nervous system loses its normal response to positional change → orthostatic hypotension (BP drops when upright). Gradual tilt table use re-trains baroreceptors. 2) WEIGHT-BEARING STIMULATION — for non-ambulatory patients (SCI, stroke, TBI) to maintain bone density, prevent pressure sores, improve bowel function, and provide proprioceptive stimulation. 3) REDUCE ORTHOSTATIC HYPOTENSION. Start at small angles (20-30°) and progress. Monitor BP and HR continuously. Compress abdomen and use abdominal binders for SCI patients.

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44. The concept of 'neuroplasticity' that underlies modern neurological rehabilitation is best described as:

A. The brain's fixed, unchangeable structure after early childhood

B. The brain's lifelong ability to reorganize its structure, function, and connections in response to experience, learning, and injury

C. Growth of new neurons in the brain after injury

D. The spinal cord's ability to bypass brain injury

✓ Answer: B

💡 **Rationale & Explanation:**

Neuroplasticity: the brain's LIFELONG CAPACITY to reorganize neural pathways and synaptic connections in response to EXPERIENCE, LEARNING, INJURY, and ENVIRONMENTAL CHANGES. Not just neurogenesis (new neuron growth — which occurs in the

hippocampus and olfactory bulb), but more broadly: SYNAPTIC STRENGTHENING (LTP — long-term potentiation), CORTICAL MAP REORGANIZATION (expansion or shrinkage of cortical representations), UNMASKING of silent synapses, and AXONAL SPROUTING. This is why rehabilitation WORKS after brain injury — intensive, repetitive, task-specific practice drives neuroplasticity. Principles of experience-dependent plasticity (Kleim and Jones): use it or lose it, use it and improve it, specificity, repetition matters, intensity matters, time matters (early treatment is better).

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45. In Parkinson's disease rehabilitation, the 'festinating gait' pattern refers to:

A. Wide-based, ataxic gait with intention tremor

B. Rapid, short, shuffling steps with increasing speed — as if the patient is chasing their own center of mass

C. Steppage gait due to foot drop

D. Scissor gait due to hip adductor spasticity

✓ Answer: B

💡 **Rationale & Explanation:**

Festinating gait (festination = 'to hasten' in Latin): a characteristic Parkinson's disease gait pattern — RAPID, SHORT, SHUFFLING STEPS that accelerate progressively (as if the patient is trying to 'catch up' to their own forward-tilted center of mass). Associated with: reduced stride length (the most impaired gait parameter in PD), reduced arm swing, forward-flexed posture (camptocormia), and 'freezing of gait' (sudden inability to continue walking). PT management: visual cues (floor stripes, laser pointer — 'step over the line'), auditory cueing (metronome, rhythmic auditory stimulation), balance training (Tai Chi, BIG gait training), and fall prevention. Festination is one of the most disabling and fall-prone features of advanced PD.

├— SPINAL CORD INJURY

46. Pressure injuries (pressure ulcers) in SCI are prevented primarily by:

A. Daily hot packs to the bony prominences

B. Regular weight shifts (every 15-30 minutes in the wheelchair), proper cushioning, skin inspection, nutrition, and avoiding friction/shear

C. Complete bed rest to minimize pressure

D. Topical antibiotic application daily

✓ Answer: B

💡 **Rationale & Explanation:**

Pressure injury prevention in SCI: LOST SENSATION means patients don't feel pain from prolonged pressure — tissue ischemia and necrosis occur silently. Prevention: 1) WEIGHT SHIFTS every 15-30 minutes in the wheelchair (lean forward, lean to the side, push up to lift the buttocks — 2 minutes of relief per shift); 2) Proper PRESSURE-RELIEVING CUSHION (gel, air, foam); 3) SKIN INSPECTION daily (use a mirror for areas the patient can't see); 4) Adequate NUTRITION (protein, zinc, vitamin C for skin integrity); 5) Avoid FRICTION/SHEAR (proper transfer technique); 6) Appropriate POSITIONING in bed (turn every 2 hours). Stage IV pressure ulcers (down to bone) require surgical debridement and flap reconstruction — months of healing. Prevention is FAR better than treatment.

NEUROLOGICAL ASSESSMENT

47. The Mini-Mental State Examination (MMSE) screens for:

A. Depression in neurological patients

B. Cognitive impairment including orientation, registration, attention, calculation, recall, language, and visuospatial function — 30 points total

C. Motor function after stroke

D. Balance and fall risk only

✓ Answer: B

💡 **Rationale & Explanation:**

MMSE (Folstein et al., 1975): the most widely used bedside COGNITIVE SCREENING tool. 30 total points covering: ORIENTATION to time (5 pts) and place (5 pts); REGISTRATION (3 pts — repeat 3 words); ATTENTION AND CALCULATION (5 pts — serial 7s or spell 'world' backward); RECALL (3 pts — recall 3 words after delay); LANGUAGE (8 pts — naming, repetition, reading, writing, following 3-stage command); VISUOSPATIAL (1 pt — copy intersecting pentagons). Interpretation: 24-30 = normal; 18-23 = mild cognitive impairment; 0-17 = severe impairment. Limitations: affected by education and language; insensitive to mild cognitive impairment (MCI). The MoCA (Montreal Cognitive Assessment) is more sensitive for MCI.

PEDIATRIC NEUROLOGY

48. The 'GMFM' (Gross Motor Function Measure) is used to:

A. Classify cerebral palsy by topographic distribution

B. Measure change in gross motor function over time in children with CP — sensitive to clinically meaningful change from PT interventions

C. Assess fine motor skills in developmental delay

D. Predict school performance in children with CP

✓ **Answer: B**

💡 **Rationale & Explanation:**

GMFM (Gross Motor Function Measure — Russell et al.): criterion-referenced measure of GROSS MOTOR FUNCTION in children with cerebral palsy. Assesses 88 items (GMFM-88) or 66 items (GMFM-66) across 5 dimensions: Lying & Rolling; Sitting; Crawling & Kneeling; Standing; Walking, Running & Jumping. Scored 0-3 per item. Used to: MEASURE CHANGE over time in response to PT, surgery (SDR, orthopedic), or pharmacological intervention (botulinum toxin). Very SENSITIVE to clinically meaningful changes — it can detect small improvements that the GMFCS (which classifies severity) would miss.

Essential tool in pediatric PT — every Philippine PT working with CP should know both GMFM and GMFCS.

NEUROLOGICAL REHABILITATION

49. Biofeedback in neurological rehabilitation (e.g., EMG biofeedback after stroke) works by:

A. Directly stimulating muscles with electrical current

B. Providing real-time VISUAL or AUDITORY feedback about muscle activity to help patients learn to voluntarily control paretic muscles

C. Mechanically assisting movement during rehabilitation

D. Providing pain relief through gate control mechanisms

✓ Answer: B

💡 Rationale & Explanation:

EMG Biofeedback: electrodes over target muscles detect electrical muscle activity. The signal is amplified and fed back to the patient in REAL TIME as a visual display (bar graph, meter) or auditory signal (beeps). The patient uses this feedback to learn voluntary muscle activation — exceeding a threshold target. In stroke: EMG biofeedback helps patients re-learn to activate paretic muscles (anterior tibialis for foot drop, wrist extensors for hand function). The real-time feedback ENHANCES motor learning by providing augmented intrinsic feedback that the patient's sensory system cannot provide effectively post-stroke. Evidence: moderate for wrist/hand function and lower extremity function post-stroke. Most effective when combined with active exercise practice.

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50. In the rehabilitation of Guillain-Barré syndrome (GBS), which statement is MOST accurate?

A. Begin aggressive strengthening immediately after diagnosis

B. Provide supportive care during the acute phase (monitor respiratory function, prevent complications), then gradually progress exercise as

inflammation resolves

C. GBS patients do not benefit from PT

D. Start full weight-bearing ambulation within the first week regardless of weakness

✓ Answer: B

💡 **Rationale & Explanation:**

Guillain-Barré Syndrome (GBS): an acute inflammatory demyelinating polyneuropathy — ascending paralysis, starting from the legs, progressing up. The ACUTE PHASE is DANGEROUS: respiratory muscle involvement can lead to respiratory failure (30% of patients require mechanical ventilation — monitor FVC, NIF). PT in the ACUTE PHASE: AVOID OVEREXERTION (can worsen nerve damage); prevent pressure sores, contractures, DVT; positioning; gentle passive ROM; respiratory monitoring and support. As inflammation resolves (subacute/recovery phase): GRADUAL PROGRESSIVE exercise — early fatigue is common; avoid overwork injury. Recovery: most recover full function over weeks to months. PT plays a critical role in the RECOVERY PHASE — progressive strengthening, balance, gait training, fatigue management.

├— STROKE REHABILITATION

51. The 'bobath neurodevelopmental treatment' key points of control are used to:

A. Apply maximal resistance to strengthen spastic muscles

B. Provide handling inputs through proximal key points (shoulder girdle, pelvis) to influence tone, facilitate normal movement, and guide the patient through functional patterns

C. Stretch tight muscles passively

D. Test reflexes clinically

✓ Answer: B

💡 **Rationale & Explanation:**

Bobath/NDT key points of control: PROXIMAL KEY POINTS — shoulder girdle (controls trunk and arm patterns) and pelvis (controls lower extremity and trunk patterns); DISTAL KEY POINTS — hands and feet (provide sensory input and guide distal movement). By handling at these specific points, the therapist: normalizes TONE (reduces hypertonia or facilitates hypotonia), INHIBITS pathological movement patterns (mass flexion/extension synergies), FACILITATES normal postural reactions and selective movement. Modern Bobath integrates motor learning principles with these traditional handling concepts. The approach is widely used in Philippine neurological PT and remains an important framework for the PRC board examination.

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52. 'Neglect' (unilateral spatial neglect) after right hemisphere stroke refers to:

A. Complete blindness on the left side

B. Failure to attend to, respond to, or orient toward stimuli on the LEFT side of space — NOT due to primary sensory or motor loss but due to attentional dysfunction

C. Left-sided weakness only

D. Difficulty with language

✓ Answer: B

💡 **Rationale & Explanation:**

Left unilateral spatial neglect (after RIGHT hemisphere stroke): the patient IGNORES everything on the LEFT side of their environment — they don't respond to people approaching from the left, they eat food only from the right side of the plate, they shave/apply makeup only on the right side of the face, they collide with obstacles on the left when walking. This is NOT due to blindness (the visual pathway may be intact) but an ATTENTIONAL DEFICIT — the right hemisphere normally monitors the entire spatial field; left hemisphere only monitors the right side. PT management: scanning training (teach patients to systematically scan to the left), environmental modifications (approach from the right initially, gradually shift to left), prism adaptation therapy, mirror therapy.

SPINAL CORD INJURY

53. In SCI rehabilitation, the goal for a T4 COMPLETE SCI patient regarding ambulation is:

A. Independent community ambulation without devices

B. Therapeutic ambulation only (energy too high for functional ambulation) — power wheelchair is the primary mobility device

C. Household ambulation with bilateral KAFOs only

D. No mobility training at all

✓ Answer: B

💡 **Rationale & Explanation:**

T4 complete SCI: the patient has no voluntary function below T4 — no lower extremity muscle activity, no trunk below T4. While THERAPEUTIC AMBULATION with KAFOs (knee-ankle-foot orthoses) on parallel bars is possible for physiological benefits (bone density, circulation, bowel function, psychological benefits), the ENERGY COST of ambulation with complete paraplegia is prohibitively HIGH (3-10x normal) — making it impractical for COMMUNITY AMBULATION. The primary functional mobility device is a MANUAL WHEELCHAIR (good upper extremity function preserved above T4) or power wheelchair if needed. Most complete T4 patients are efficient community wheelchair users, participating fully in life. Don't conflate 'can walk in PT gym with massive assistance' with 'functional ambulation.'

NEUROLOGICAL ASSESSMENT

54. The 'two-point discrimination test' (2PD) assesses:

A. Motor coordination

B. Tactile spatial resolution — the minimum distance at which two points of stimulation are perceived as separate (tests peripheral

sensory and cortical discriminative touch)

C. Proprioception and joint position sense

D. Deep pressure pain threshold

✓ **Answer: B**

💡 **Rationale & Explanation:**

Two-point discrimination (2PD): the minimum distance between two simultaneous skin contacts that can be perceived as TWO SEPARATE points (not one). Measures FINE DISCRIMINATIVE TOUCH — primarily mediated by Meissner's corpuscles (moving 2PD) and Merkel's discs (static 2PD), transmitted via the DORSAL COLUMN — MEDIAL LEMNISCAL pathway to the somatosensory cortex. Normal values: fingertip 2-5mm; palm 8-12mm; dorsal hand 20-30mm. Uses: assess peripheral nerve damage (CTS — impaired digital 2PD), monitor nerve regeneration post-repair, assess cortical discrimination (stroke — impaired despite intact peripheral nerve). Measured with a calibrated aesthetiometer or bent paperclip.

├─ NEUROLOGICAL REHABILITATION

55. In Parkinson's disease, the 'amplitude-based' treatment approach (LSVT-BIG, LSVT-LOUD) is effective because:

A. PD patients need slower, smaller movements to be safe

B. PD patients systematically UNDERESTIMATE the amplitude of their own movements — recalibrating with exaggerated BIG movements corrects this internal scaling deficit

C. PD patients prefer rapid small movements

D. The approach is primarily psychological

✓ **Answer: B**

💡 **Rationale & Explanation:**

LSVT-BIG/LOUD rationale: the core problem in PD motor control is that patients' internal 'gain' for movement amplitude is SET TOO LOW — they generate SMALLER movements than they intend (hypokinesia),

and crucially, they FEEL NORMAL when actually moving small. Their internal reference has been recalibrated toward small. The BIG/LOUD approach: by training exaggerated, LARGE amplitude movements INTENSIVELY, patients recalibrate their internal movement sense to produce appropriately sized movements when they aim for 'BIG.' The 4-week intensive format (16 sessions) is essential — it takes intensive repetition to shift the internal scaling. The gains generalize to all movements (not just the trained ones) because the AMPLITUDE SCALING itself is retrained.

NEUROLOGICAL ASSESSMENT

56. The 'ten-second step test' (10SST) in Parkinson's disease assesses:

A. Balance only

B. The number of steps taken in 10 seconds — a measure of gait initiation ability and freezing of gait

C. Cognitive function during walking

D. Cardiorespiratory fitness

✓ Answer: B

💡 Rationale & Explanation:

The 10-second step test or counting steps in place: the patient is asked to step in place as quickly as possible for 10 seconds. Normally: patients should take >15 steps in 10 seconds. Reduced step count or freezing during the test indicates: impaired gait initiation, bradykinesia, or freezing of gait. This is a SIMPLE, QUICK CLINICAL MEASURE that predicts: fall risk, future freezing of gait severity, disease progression. Combined with other PD-specific measures (TUG, 10MWT, UPDRS gait subscore, FOG questionnaire), it provides a comprehensive picture of gait function. PT uses this test to identify patients needing specific gait cueing strategies (rhythmic auditory stimulation, visual floor cues) and fall prevention intervention.

NEUROLOGICAL REHABILITATION

57. Spasticity management in neurological conditions: INTRATHECAL BACLOFEN (ITB) pump is indicated for:

A. Mild spasticity manageable with oral medications

B. Severe, generalized spasticity (especially in SCI and CP) that is NOT adequately controlled by oral medications and impairs function, care, or quality of life

C. Post-stroke spasticity affecting one joint only

D. Focal spasticity of the calf muscles after stroke

✓ Answer: B

💡 **Rationale & Explanation:**

Intrathecal baclofen (ITB) pump: a surgically implanted pump delivers BACLOFEN (GABA-B receptor agonist) DIRECTLY INTO THE INTRATHECAL SPACE (around the spinal cord), allowing very small doses to achieve a large effect — avoiding the sedation and weakness of high oral doses. Indications: SEVERE, GENERALIZED SPASTICITY affecting multiple limbs (SCI, CP, MS, TBI) that significantly impairs: function (positioning, transfers, hygiene), causes pain, or prevents participation in rehabilitation — AND is inadequately controlled by oral baclofen, tizanidine, or other agents. Focal spasticity (one muscle group) = BOTULINUM TOXIN (Botox) injection (more targeted). PT post-ITB implant: take advantage of reduced tone to improve range of motion, function, and positioning.

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58. 'Graded exposure therapy' for kinesiophobia and fear-avoidance in chronic pain involves:

A. Forcing patients to do feared activities maximally on day one

B. A hierarchical, systematic approach: identifying feared activities → creating a fear hierarchy → gradually exposing the patient to feared movements starting from least feared, with education and reassurance

C. Complete avoidance of all painful activities

D. Only cognitive therapy without physical activity

✓ **Answer: B**

💡 **Rationale & Explanation:**

Graded exposure therapy (GET): based on the FEAR-AVOIDANCE MODEL. Steps: 1) EDUCATION — explain pain neuroscience (pain does not equal damage in chronic pain); 2) FUNCTIONAL ANALYSIS — identify specific feared activities and their triggers; 3) FEAR HIERARCHY — list feared activities from least to most feared (using Perceived harmfulness questionnaire); 4) GRADED EXPOSURE — systematically expose patient to feared activities starting from LEAST FEARED, moving up the hierarchy as confidence builds; 5) COGNITIVE RESTRUCTURING — challenge catastrophic beliefs. Key: therapist provides ENCOURAGEMENT and EDUCATION during exposures ('your body is not being damaged'). GET has strong evidence for CRPS, chronic LBP, chronic WAD, and post-surgical fear-avoidance. Kinesiophobia must be addressed for full recovery.

├─ TRAUMATIC BRAIN INJURY

59. In severe TBI rehabilitation, the concept of 'post-traumatic agitation' refers to:

A. Normal distress after injury

B. A state of cognitive, emotional, and behavioral dysregulation including aggression, impulsivity, restlessness, and verbal/physical outbursts — commonly seen during the emergence from PTA

C. Chronic depression after TBI

D. Seizure activity

✓ **Answer: B**

💡 **Rationale & Explanation:**

Post-traumatic agitation (PTA agitation): commonly seen during emergence from post-traumatic amnesia (Rancho Levels IV-V). Characterized by: MOTOR AGITATION (restlessness, pulling at tubes,

climbing out of bed), AGGRESSIVE BEHAVIOR (hitting, biting, kicking), EMOTIONAL LABILITY (crying, swearing, screaming), COGNITIVE IMPAIRMENT (disorientation, perseveration). Management: LOW STIMULATION ENVIRONMENT (quiet room, consistent staff, predictable routine); PHYSICAL SAFETY (padded environment, soft limb restraints only if absolutely necessary); BEHAVIORAL APPROACHES (redirection, calm reassurance — NOT confrontation); PHARMACOLOGICAL (amantadine, propranolol — to reduce agitation duration/severity); FAMILY EDUCATION. PT during agitation: brief, simple, functional activities; avoid cognitively demanding or frustrating tasks.

├— PEDIATRIC NEUROLOGY

60. The 'tethered cord syndrome' in pediatric PT is characterized by:

A. Normal neurological function throughout childhood

B. Progressive neurological deficits (leg weakness, bladder/bowel dysfunction, back pain, scoliosis) from the spinal cord being anchored (tethered) to the spinal canal — unable to ascend normally with growth

C. Hip dislocation in infancy

D. Normal gait until age 5

✓ Answer: B

💡 **Rationale & Explanation:**

Tethered cord syndrome: the spinal cord is abnormally ANCHORED to the spinal canal structures (by a thickened filum terminale, lipoma, dermoid cyst, or post-surgical scar), preventing it from ascending normally as the spine grows. As the child grows: the cord is STRETCHED → progressive neurological deterioration. Signs: progressive lower extremity weakness, gait deterioration, bladder/bowel dysfunction (neurogenic bladder, fecal incontinence), low back pain, foot deformities (cavovarus), scoliosis. Often associated with spina bifida occulta. Treatment: surgical 'untethering' — releasing

the cord attachment. PT post-surgery: may show improvement in neurological function; ongoing rehabilitation for strengthening, gait, and bladder management.

NEUROLOGICAL REHABILITATION

61. The SCI 'functional electrical stimulation (FES) ergometry' system is used to:

A. Test cardiovascular fitness only

B. Electrically stimulate paralyzed lower extremity muscles to perform cycling — providing exercise, maintaining muscle mass, bone density, and cardiovascular fitness in SCI patients

C. Treat spasticity through electrical inhibition

D. Test motor completeness of injury

✓ Answer: B

💡 **Rationale & Explanation:**

FES ergometry: surface electrodes stimulate the quadriceps, hamstrings, gluteals, and calf muscles of a paralyzed patient in a CYCLING PATTERN. Benefits in SCI: 1) CARDIOVASCULAR FITNESS — the large muscle mass activated increases VO2 and cardiac output meaningfully; 2) MUSCLE MASS maintenance — prevents muscle atrophy below the injury; 3) BONE DENSITY — mechanical loading reduces osteoporosis risk; 4) CIRCULATION — reduces DVT risk; 5) PSYCHOLOGICAL WELLBEING — patients feel engaged in active exercise. Limitations: limited by skin tolerance, high fatigue of paralyzed muscles, and equipment cost. Combined FES + arm ergometry provides significantly higher cardiovascular training intensity. This is an important SCI rehabilitation modality that may be on the boards.

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62. 'Supported treadmill training' vs 'overground walking training' in stroke rehabilitation — current evidence suggests:

A. Treadmill training is always superior

B. Both are effective, with similar long-term outcomes for walking speed and distance — choice should be based on patient preference, safety, and available resources

C. Overground walking is always superior

D. Neither is effective for stroke rehabilitation

✓ Answer: B

💡 **Rationale & Explanation:**

Evidence for treadmill vs overground walking after stroke: large RCTs (including the LEAPS trial) show COMPARABLE outcomes between body-weight supported treadmill training (BWSTT), overground PT walking practice, and home exercise for community-dwelling stroke survivors with walking deficits. Walking ability improved in ALL groups. The key takeaway: the TYPE of walking practice matters less than the AMOUNT and INTENSITY. Get the patient walking — a lot, intensively, consistently — regardless of whether it's on a treadmill, overground, or in the community. Patient preference, safety, and available resources should guide the choice. Modern stroke rehabilitation guidelines emphasize HIGH DOSAGE and HIGH REPETITION of task practice.

├— NEUROLOGICAL ASSESSMENT

63. In electrodiagnostic studies (EMG/NCS), a 'reduced recruitment pattern' indicates:

A. Normal motor unit activation

B. Upper motor neuron lesion — too few motor units are firing because upper motor neuron drive is reduced

C. Lower motor neuron lesion — fewer motor units are available to recruit due to axon loss

D. Normal nerve conduction velocity

✓ Answer: B

💡 **Rationale & Explanation:**

EMG recruitment pattern: NORMAL: as force demand increases, more motor units are recruited (spatial summation) and each fires faster (temporal summation) — FULL INTERFERENCE PATTERN at maximum effort. REDUCED RECRUITMENT: fewer motor units fire than expected for the force generated — seen in: LMN lesions (fewer motor units available due to axon loss — neurogenic pattern); also in pain inhibition (patient not making full effort). RAPID RECRUITMENT: motor units reach maximum rate before other units are recruited — characteristic of myopathic conditions (individual motor units are weak, so more units fire at lower force levels). Distinguishing UMN from LMN lesions: UMN = reduced voluntary activation but normal EMG findings; LMN = neurogenic EMG changes (fibrillations, increased MUP size and duration, reduced recruitment).

NEUROLOGICAL REHABILITATION

64. Virtual reality (VR) rehabilitation for stroke: the primary mechanism of benefit is:

A. Only entertainment value

B. Providing intensive, repetitive, task-specific practice in a motivating, engaging, and safe environment that drives neuroplasticity

C. Replacing conventional PT completely

D. Reducing spasticity through distraction

✓ **Answer: B**

💡 **Rationale & Explanation:**

VR rehabilitation: uses interactive virtual environments where the patient's movements are captured and used to control a virtual avatar or game. Benefits: 1) INTENSIVE REPETITION — patients perform hundreds of repetitions per session (neuroplasticity requires repetition); 2) ENGAGEMENT — the gamified environment increases motivation and participation, allowing longer sessions; 3) AUGMENTED

FEEDBACK — real-time visual feedback on movement quality; 4) SAFE ENVIRONMENT — tasks that might be dangerous in real life can be practiced safely; 5) VARIABLE PRACTICE — easy to vary task parameters (contextual interference). Evidence: moderate-strong for upper extremity function, balance, and gait post-stroke. VR is ADJUNCTIVE to conventional PT — not a replacement. The Wii, Xbox Kinect, and commercial VR headsets have all been studied in stroke rehabilitation.

SPINAL CORD INJURY

65. In a T12 complete SCI patient, which functional goal is MOST realistic for ambulation?

A. Independent community ambulation without devices

B. Household ambulation with bilateral knee-ankle-foot orthoses (KAFOs) and forearm crutches for therapeutic/exercise purposes — not typically functional community ambulation

C. No ambulation possible

D. Community ambulation without assistive devices

✓ Answer: B

💡 Rationale & Explanation:

T12 complete SCI: NO voluntary lower extremity function (all LE muscles below T12 are paralyzed), but: full UPPER EXTREMITY function (great for balance and crutch use), partial TRUNK STABILITY (T1-T12 function preserved). Ambulation with KAFOs + forearm crutches IS possible but: energy cost is 3-9x normal gait; physiologically demanding; requires significant balance and upper body strength. FUNCTIONAL CLASSIFICATION: T12 complete = HOUSEHOLD AMBULATOR at best (short distances at home for exercise, cardiovascular, bone density benefits — not for functional community mobility). The manual wheelchair remains the primary community mobility device. Exception: very young, highly motivated, well-physiqued patients may achieve limited community ambulation with

high effort. Prognosis: being realistic is ethically important and respects patient autonomy.

NEUROLOGICAL REHABILITATION

66. 'Wrist-hand orthoses' (WHO) for the post-stroke hemiplegic hand are used for:

A. Strengthening the wrist extensors

B. Preventing flexion contracture, maintaining a functional position, managing spasticity, and facilitating hygiene — especially during the flaccid or spastic phase

C. Providing active-assisted exercise

D. Replacing physical therapy

✓ Answer: B

💡 Rationale & Explanation:

Wrist-hand orthoses (splints) for hemiplegic hand: After stroke, the typical pattern is wrist flexion + finger flexion + thumb across palm (UE flexion synergy). Without positioning, this leads to: WRIST FLEXION CONTRACTURE, thumb-in-palm deformity, maceration and infection (skin breakdown where flexed fingers contact palm). WHO functions: 1) Maintain FUNCTIONAL POSITION (wrist in neutral to slight extension, fingers open); 2) PREVENT CONTRACTURE; 3) REDUCE SPASTICITY (sustained stretch at comfortable range); 4) FACILITATE HYGIENE (easier to clean the palm if fingers are open). Worn intermittently (2-4 hours at a time or at night). Fabricated by OT or PT. Rigid splints vs. soft lycra splints — each has different indications. Always combine with active exercises and functional use.

NEUROLOGICAL ASSESSMENT

67. The 'Kurtzke Expanded Disability Status Scale' (EDSS) is used to:

A. Grade TBI severity

B. Quantify disability in MULTIPLE SCLEROSIS on a scale from 0 (normal) to 10 (death from MS)

C. Assess stroke motor impairment

D. Classify SCI completeness

✓ Answer: B

💡 **Rationale & Explanation:**

EDSS (Expanded Disability Status Scale — Kurtzke): the most widely used outcome measure in MULTIPLE SCLEROSIS clinical trials and practice. Scale: 0 = Normal neurological exam; 1.0-3.5 = Increasing disability in functional systems (pyramidal, cerebellar, brainstem, sensory, bowel/bladder, visual, cerebral); 4.0 = Limited self-sufficient ambulatory ability; 6.0 = Unilateral or bilateral assistance (cane/crutch) required to walk; 7.0 = Restricted to wheelchair; 8.0 = Essentially restricted to bed; 9.0 = Helpless bed patient; 10.0 = Death due to MS. PT uses EDSS: track disease progression, guide treatment intensity, set realistic functional goals. EDSS changes of ≥1.5 points are considered clinically meaningful.

NEUROLOGICAL REHABILITATION

68. 'Respiratory PT' for a patient with spinal cord injury at C4 level should include:

A. High-intensity aerobic exercise

B. Assisted cough technique (manually assisted cough using abdominal thrust), incentive spirometry, diaphragmatic exercises, and respiratory muscle training

C. Passive ROM only

D. Daily chest percussion

✓ Answer: B

💡 **Rationale & Explanation:**

C4 complete SCI respiratory management: at C4, the DIAPHRAGM is preserved (C3-C4-C5), but ALL INTERCOSTALS (T1-T12) and ABDOMINALS (T10-L1) are paralyzed. Respiratory implications: reduced INSPIRATORY CAPACITY (intercostal muscles paralyzed); severely reduced COUGH (abdominal muscles needed for forced expiration are paralyzed — cough is ineffective). PT interventions: ASSISTED COUGH (therapist places hands on the abdomen and provides a manual thrust during expiration — increases expiratory force); INCENTIVE SPIROMETRY (maximizes inspiratory volume, prevents atelectasis); DIAPHRAGMATIC BREATHING EXERCISES (strengthen the only functional inspiratory muscle); ABDOMINAL BINDER (provides external support for the abdominal contents, improving diaphragm efficiency in upright position); regular POSITIONING changes to prevent secretion pooling.

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69. Post-stroke visual field defect 'homonymous hemianopia' means:

A. Blindness in both eyes

B. Loss of vision in the SAME half of the visual field in both eyes — e.g., left homonymous hemianopia = loss of the left half of vision in BOTH eyes (left visual field of left eye + left visual field of right eye)

C. Loss of vision in one eye only

D. Tunnel vision

✓ Answer: B

💡 **Rationale & Explanation:**

Homonymous hemianopia: caused by damage to the optic tract or occipital cortex POSTERIOR to the optic chiasm. SAME HALF of the visual field is lost in BOTH eyes (because axons from both eyes representing the same visual field travel together after the chiasm). Left homonymous hemianopia = loss of left visual field in both eyes → the patient 'sees' only the right half of everything. They may read only half of a page, collide with objects on their blind side, have difficulty with mobility. PT management: SCANNING TRAINING (teach patient to systematically turn head to compensate for the missing field), environmental modification, use of visual cues in the intact field during

gait and ADL training. Often accompanies right hemisphere stroke with left neglect — both must be addressed.

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70. In children with cerebral palsy, botulinum toxin (Botox) injections for spasticity are most effective when combined with:

A. Rest and immobilization for 6 weeks

B. Intensive PT/OT rehabilitation, serial casting, and orthotics — immediately after injection while spasticity is reduced

C. Oral baclofen only

D. No adjunct therapy — injection alone is sufficient

✓ Answer: B

💡 **Rationale & Explanation:**

Botulinum toxin (BoNT-A) injections for spastic CP: the toxin BLOCKS ACETYLCHOLINE RELEASE at the neuromuscular junction → temporary muscle weakness and reduced spasticity for 3-6 months. CRITICAL: the injection alone provides a 'WINDOW OF OPPORTUNITY' — to maximize gains, INTENSIVE REHABILITATION must begin IMMEDIATELY (within days): INTENSIVE PT/OT: goal-directed upper extremity training, gait training, functional task practice while the spastic muscle is relaxed. SERIAL CASTING: taking advantage of reduced tone to gain ROM and remodel soft tissues. ORTHOTICS: AFOs and splints to maintain the length gained. Without rehabilitation, the Botox effect is largely wasted. The combination approach has much better evidence than injection alone for functional outcomes.

├— PEDIATRIC NEUROLOGY

71. Congenital muscular torticollis (CMT) in infants is treated by PT primarily through:

A. Surgical correction in all cases

B. Passive and active STRETCHING of the sternocleidomastoid (SCM), cervical range of motion exercises, and repositioning strategies —

most cases resolve without surgery with early PT

C. Splinting the head in neutral

D. Massage only

✓ Answer: B

💡 **Rationale & Explanation:**

Congenital muscular torticollis (wry neck): unilateral SHORTENING of the STERNOCLEIDOMASTOID muscle, causing the head to TILT toward the affected side and ROTATE away. Caused by fibrosis of the SCM (possibly from intrauterine position or birth trauma). The contracted SCM: tilts head to same side + rotates chin to opposite side. PT treatment: PASSIVE STRETCHING (lateral flexion AWAY from the tight SCM, rotation TOWARD the tight SCM), ACTIVE EXERCISES, REPOSITIONING (encourage head turning to the opposite side). Start PT EARLY (before 3 months) for best outcomes — most cases resolve within 6-12 months with consistent PT. Uncorrected CMT causes: plagiocephaly (skull flattening), facial asymmetry, shoulder elevation, scoliosis. Surgery for refractory cases (rare).

├— NEUROLOGICAL ASSESSMENT

72. The 'Braden Scale' is used to assess:

A. Motor function in stroke

B. Risk of developing pressure ulcers — scores sensory perception, moisture, activity, mobility, nutrition, and friction/shear

C. Cognitive function in TBI

D. Falls risk in the elderly

✓ Answer: B

💡 **Rationale & Explanation:**

Braden Scale: the most widely used tool for PRESSURE ULCER RISK ASSESSMENT. Scores 6 subscales: 1) SENSORY PERCEPTION (ability to respond to pressure discomfort); 2) MOISTURE (skin exposure to moisture — incontinence); 3) ACTIVITY (degree of physical activity); 4)

MOBILITY (ability to change and control body position); 5) NUTRITION (usual food intake); 6) FRICTION AND SHEAR. Each scored 1-4 (except friction/shear = 1-3). Total range: 6-23. INTERPRETATION: 23 = no risk; 15-18 = mild risk; 13-14 = moderate risk; 10-12 = high risk; ≤9 = very high risk. PT relevance: all immobile, neurologically impaired, and post-surgical patients should be Braden scored. Low scores = implement prevention strategies immediately (turning schedule, pressure-relieving mattress, nutrition optimization, PT for early mobilization).

NEUROLOGICAL REHABILITATION

73. In post-stroke aphasia rehabilitation, 'melodic intonation therapy' (MIT) is used for:

A. Any type of aphasia

B. Predominantly NON-FLUENT (Broca's) aphasia — using the melodic, rhythmic patterns of speech to activate the RIGHT hemisphere compensatory language processing

C. Receptive (Wernicke's) aphasia only

D. Dysarthria only

✓ Answer: B

💡 Rationale & Explanation:

Melodic Intonation Therapy (MIT — Albert et al.): a technique using the MUSICAL PROPERTIES of language (melody, rhythm, stress) to retrain speech in patients with NON-FLUENT APHASIA (Broca's aphasia). Rationale: right hemisphere processes music and prosody; by 'singing' phrases (exaggerating the melodic pattern of speech), the right hemisphere compensatory language network is activated. Steps: rhythmic tapping of the left hand while singing phrases, transitioning from sung to spoken output. Evidence: good for improving phrase production and communication in patients with non-fluent aphasia, especially with left hemisphere damage. NOT appropriate for Wernicke's aphasia (comprehension deficit) or mild aphasia. Also not for dysarthria (motor speech disorder, not language).

STROKE REHABILITATION

74. The '10-Meter Walk Test' (10MWT) in stroke patients: a speed of <0.4 m/s indicates:

A. Normal community ambulation

B. HOUSEHOLD OR LIMITED AMBULATOR — very limited functional mobility; typically uses a wheelchair for community distances

C. High fall risk only

D. Normal for older adults

✓ Answer: B

💡 Rationale & Explanation:

10MWT speed classification in stroke: <0.4 m/s = HOUSEHOLD AMBULATOR (limited to walking in small spaces at home, not community-functional); 0.4-0.8 m/s = LIMITED COMMUNITY AMBULATOR (can walk some community distances but needs assistance or significant rest breaks); >0.8 m/s = COMMUNITY AMBULATOR (can manage most community walking demands). >1.0 m/s = exceeds the threshold for crossing streets safely at pedestrian lights. In acute and subacute stroke, progressive gait training aims to improve from household toward community ambulation speed. The MCID for 10MWT in stroke: ~0.16 m/s. Tracking gait speed over the rehabilitation admission provides objective evidence of progress.

SPINAL CORD INJURY

75. The 'International Standards for Neurological Classification of SCI' (ISNCSCI) requires testing of how many key muscle groups?

A. 5 per side

B. 10 PER SIDE (20 total) — representing key muscles from C5 to S1 for upper and lower extremities

C. 20 per side

D. 3 per side

✓ **Answer: B**

💡 **Rationale & Explanation:**

ISNCSCI motor assessment: 10 KEY MUSCLES PER SIDE (20 total): Upper extremity: C5 = elbow flexors (biceps); C6 = wrist extensors (ECRB); C7 = elbow extensors (triceps); C8 = finger flexors (FDP of middle finger); T1 = finger abductors (abductor digiti minimi). Lower extremity: L2 = hip flexors (iliopsoas); L3 = knee extensors (quadriceps); L4 = ankle dorsiflexors (tibialis anterior); L5 = long toe extensors (EHL); S1 = ankle plantarflexors (gastrocnemius). Each muscle graded 0-5 (MRC scale). Bilateral examination gives maximum MOTOR SCORE of 100. The sensory examination tests 28 dermatomes bilaterally for light touch and pinprick. This ISNCSCI examination determines: motor level, sensory level, neurological level, and ASIA impairment scale grade.

├— NEUROLOGICAL REHABILITATION

76. 'Proprioceptive training' for neurological patients aims to improve:

A. Muscle strength

B. The accuracy of POSITION SENSE AND MOVEMENT DETECTION — retraining afferent neural pathways damaged by the neurological injury to improve joint position awareness, balance, and movement control

C. Pain sensitivity

D. Cardiovascular fitness

✓ **Answer: B**

💡 **Rationale & Explanation:**

Proprioceptive training in neurological conditions: after stroke, TBI, SCI, peripheral neuropathy, or vestibular disorders, proprioceptive input from joints, muscles, and skin is disrupted. Proprioceptive

training: JOINT POSITION MATCHING tasks (replicate a target joint angle with eyes closed — assesses proprioceptive accuracy); THRESHOLD DETECTION (smallest detectable movement); BALANCE EXERCISES with progressive sensory challenge (Frenkel exercises for ataxia, single-leg stance on unstable surfaces); VIBRATION TRAINING (vibration stimulates Ia afferents — used for spasticity management and sensorimotor retraining). Frenkel's exercises (historical but still used): systematic coordination exercises for cerebellar and sensory ataxia — heel-to-toe walking, heel-to-shin exercises, progressive gait patterns with eyes open then closed.

├─ NEUROLOGICAL ASSESSMENT

77. The 'Berg Balance Scale item #14' (standing on one foot unsupported) is scored:

A. 0 = unable to stand

B. 4 = able to lift one leg independently and hold >10 seconds without aid

C. 3 = able to take 3+ steps

D. 1 = tries but cannot

✓ Answer: B

💡 **Rationale & Explanation:**

BBS Item 14 scoring (standing on one foot): 4 = able to lift one leg INDEPENDENTLY and hold >10 seconds; 3 = able to lift one leg independently and hold 5-10 seconds; 2 = able to lift one leg independently and hold 3-4 seconds; 1 = tries to lift leg but unable to hold for 3 seconds, able to maintain standing independently; 0 = unable to attempt or needs assist to prevent fall. Each of the 14 BBS items is scored 0-4, with specific standardized criteria for each score level. Understanding the scoring criteria (not just the total score) allows PTs to document what exactly the patient CAN and CANNOT do — providing precise, meaningful outcome documentation that communicates functional ability clearly to the whole team.

NEUROLOGICAL REHABILITATION

78. In rehabilitation, 'dual-task training' improves:

A. Strength only

B. The ability to perform two tasks SIMULTANEOUSLY — training the attentional and cognitive-motor allocation systems that are impaired after neurological injury, improving real-world functional performance

C. Balance in isolation only

D. Lower extremity endurance

✓ Answer: B

💡 Rationale & Explanation:

Dual-task training: real-world activities require simultaneous performance of MOTOR and COGNITIVE tasks (walking while talking, carrying a bag while looking around). After stroke, TBI, or in Parkinson's disease, the cognitive resources needed for motor control are increased, leaving fewer resources for concurrent cognitive tasks. Dual-task interference is a major fall risk. Dual-task training: practice walking while counting backwards, naming animals, carrying a tray, answering questions, etc. Evidence: progressively challenging dual-task programs improve gait speed, balance, and fall rates in stroke, PD, and elderly populations. The dual-task cost (performance decrease on either task during dual-task vs. single-task conditions) decreases with training — the nervous system becomes more efficient at resource allocation.

NEUROLOGICAL ASSESSMENT

79. The 'Postural Assessment Scale for Stroke' (PASS) assesses:

A. Cognitive function

B. POSTURAL CONTROL in stroke patients — maintaining and changing body positions (lying, sitting, standing), with high sensitivity to change in early stroke rehabilitation

C. Motor function of the affected arm

D. Walking speed only

✓ **Answer: B**

💡 **Rationale & Explanation:**

PASS (Postural Assessment Scale for Stroke): 12-item scale assessing POSTURAL CONTROL specifically in stroke patients. Evaluates: MAINTAINING POSITIONS (sitting without support, standing with eyes open, eyes closed, on non-paretic leg, on paretic leg); CHANGING POSITIONS (sitting up from lying, rising from sitting to standing, sitting to lying, standing to sitting, picking up a pencil, stepping up on a small bench). Each item scored 0-3. Total 0-36. PASS is sensitive to change in EARLY STROKE rehabilitation (within the first weeks), when other scales like the BBS may have floor effects (patient too impaired to perform BBS items). Used to track early postural control recovery before the patient has enough function for BBS items.

├— SPINAL CORD INJURY

80. 'Neuropathic pain' after spinal cord injury is characterized by:

A. Musculoskeletal pain from overuse of the shoulders

B. Pain BELOW or AT THE LEVEL of injury in an area with impaired sensation — burning, stabbing, shooting, or electric-like pain from central sensitization of the injured spinal cord

C. Phantom limb pain only

D. Psychogenic pain only

✓ **Answer: B**

💡 **Rationale & Explanation:**

SCI neuropathic pain: occurs in 40-70% of SCI patients. Located: AT OR BELOW the neurological level of injury — in areas with abnormal or

absent sensation. Character: burning, stabbing, shooting, electric-like, aching — often described as unlike normal pain. Mechanism: central sensitization of the spinal cord (dorsal horn hyperexcitability), spontaneous activity in deafferented pathways, reorganization of spinal and supraspinal pain circuits. Types: AT-LEVEL pain (around the injury level — often from nerve root involvement); BELOW-LEVEL pain (from central cord changes). Management: medications (gabapentin, pregabalin, duloxetine, tricyclics), TENS, mirror therapy, graded motor imagery, CBT/psychological support, PT for overall wellbeing. Neuropathic pain in SCI is often treatment-resistant — multidisciplinary management is essential.

NEUROLOGICAL REHABILITATION

81. The 'Padua scale' for weakness in Guillain-Barré syndrome rates:

A. Spasticity level

B. FUNCTIONAL DISABILITY: 0 = healthy; 1 = minor symptoms; 2 = walks 5 meters without aid; 3 = walks with aid; 4 = bedridden/chair-bound; 5 = requires assisted ventilation; 6 = death

C. Cognitive impairment

D. Sensory level

✓ Answer: B

💡 **Rationale & Explanation:**

GBS Disability scale (modified Hughes, or GBS functional scale): 0 = Healthy; 1 = Minor symptoms but able to run; 2 = Able to WALK >5 meters independently (or with support); 3 = Can walk only WITH AID; 4 = UNABLE TO WALK — confined to bed or wheelchair; 5 = Requires ASSISTED VENTILATION; 6 = DEATH. This scale guides clinical decision-making: ventilator monitoring when score approaches 4-5; PT intensity modified based on functional level. In the acute phase (ascending paralysis, peak disability): PT focuses on monitoring respiratory function, preventing complications (contractures, pressure ulcers, DVT), positioning, and gentle passive ROM. Recovery phase:

progressive active exercise, gait rehabilitation, functional retraining. Most GBS patients reach score 0-2 within 12 months.

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82. **'Task-oriented reaching training' after stroke specifically targets:**

A. Lower extremity function

B. Upper extremity motor recovery by practicing REACHING TO VARIOUS TARGETS in different directions, heights, and distances — using repetitive, goal-directed, meaningful tasks to drive cortical reorganization

C. Cognitive retraining only

D. Lower extremity balance

✓ Answer: B

💡 **Rationale & Explanation:**

Task-oriented reaching training: repetitive, goal-directed reaching practice toward real objects (cups, buttons, light switches) in a variety of spatial locations. The task orientation (reaching for a MEANINGFUL GOAL) activates attention, motivation, and goal-directed neural circuits more effectively than rote movement practice. Evidence: intensive repetitive reaching training (GRASP program — Graded Repetitive Arm Supplementary Program) has strong RCT evidence for improving upper extremity function after stroke. 30 minutes of upper extremity practice beyond standard PT: ~130 repetitions of task-specific practice per session. Key principles: SUFFICIENT REPETITION (hundreds per session), TASK SPECIFICITY (real functional tasks), PROGRESSIVE DIFFICULTY (adjust height, distance, weight), FEEDBACK (visual, auditory, therapist). Technology-assisted reaching (robotics, VR, task-specific games) can further increase repetition.

NEUROLOGICAL ASSESSMENT

83. **The 'four square step test' (FSST) assesses:**

A. Upper extremity strength

B. DYNAMIC BALANCE AND LATERAL STEPPING ABILITY — the patient steps clockwise and counterclockwise through four squares marked on the floor; normative time <15 seconds; >15 seconds = increased fall risk

C. Gait speed only

D. Tandem walking balance

✓ Answer: B

💡 **Rationale & Explanation:**

Four Square Step Test (FSST): four canes are placed on the floor creating four squares. Patient stands in square 1 and steps into each square in order (1→2→3→4→1) clockwise, then counter-clockwise, stepping forward, sideways, and backward. TIME is measured. Normative data: <15 seconds = no fall risk; >15 seconds = increased fall risk in community-dwelling elderly and neurological patients. Advantages: assesses MULTI-DIRECTIONAL stepping (unlike the TUG which is primarily forward/backward); clinically relevant to community ambulation where stepping over obstacles, turning in different directions, and lateral stepping are required; easy to administer and score; sensitive to change with balance training. Used in: stroke, PD, multiple sclerosis, TBI, vestibular disorders, and falls prevention programs.

NEUROLOGICAL REHABILITATION

84. 'Task analysis' in the Motor Relearning Programme (Carr and Shepherd) involves:

A. Measuring ROM at all joints

B. Systematically IDENTIFYING THE MISSING COMPONENTS — observing the patient attempt the task, comparing to normal biomechanics, identifying which specific components of movement are absent or impaired — then designing practice to address those specific deficits

C. Testing muscle strength only

D. Applying tonic reflexes

✓ **Answer: B**

💡 **Rationale & Explanation:**

Task analysis (MRP): Carr and Shepherd emphasized that effective neurological rehabilitation requires UNDERSTANDING EXACTLY WHAT THE PATIENT CANNOT DO. Steps: 1) OBSERVE the patient attempting the task (sit-to-stand, reaching, walking); 2) COMPARE to normal biomechanics (what should the movement look like?); 3) IDENTIFY MISSING COMPONENTS (which specific phases or muscle activations are absent or poorly timed?); 4) PRACTICE the missing components in isolation; 5) PRACTICE the whole task; 6) TRANSFER to other environments. Example: sit-to-stand task analysis might reveal: patient cannot initiate forward trunk lean (missing initial flexion phase) — specifically practice trunk forward lean with load; then practice the full STS with specific cueing for trunk lean. This targeted approach is more efficient than general exercise.

├— SPINAL CORD INJURY

85. 'Orthostatic hypotension' (OH) in SCI is defined as a drop in systolic BP of:

A. 5 mmHg on sitting

B. ≥20 mmHg SYSTOLIC or ≥10 mmHg DIASTOLIC when moving from lying to sitting or standing — occurring due to loss of sympathetic vasoconstriction below the injury level

C. 50 mmHg only in severe cases

D. Any BP drop with position change

✓ **Answer: B**

💡 **Rationale & Explanation:**

Orthostatic hypotension (OH) in SCI: defined as ≥20 mmHg drop in SYSTOLIC BP or ≥10 mmHg drop in DIASTOLIC BP within 3 minutes of

standing/sitting up. Cause: above T6 SCI = loss of sympathetically mediated vasoconstriction in the large vascular beds of the abdomen and lower extremities → blood pools in these areas → venous return drops → CO drops → BP falls. Symptoms: dizziness, lightheadedness, near-syncope, blurred vision. Prevention/management: ABDOMINAL BINDER (reduces venous pooling in abdomen); COMPRESSION STOCKINGS (reduces venous pooling in legs); GRADUAL POSITION CHANGES (tilt table progression); ADEQUATE HYDRATION; PHARMACOLOGICAL (fludrocortisone, midodrine for refractory cases). Orthostatic hypotension is a major barrier to rehabilitation — it must be managed to allow upright activities.

NEUROLOGICAL REHABILITATION

86. 'Partial weight-bearing gait training' using a harness over a treadmill (BWSTT) is beneficial because:

A. It eliminates all sensory input

B. It provides SUFFICIENT LIMB LOADING to activate spinal CPG circuits while REDUCING FALL RISK and assisting the patient in achieving a more normal gait pattern — allowing earlier and more intensive gait practice

C. It replaces manual gait therapy

D. It treats spasticity directly

✓ Answer: B

💡 **Rationale & Explanation:**

BWSTT rationale: 1) SAFETY: the harness prevents falls — the patient can practice gait without the therapist manually supporting them, allowing the therapist to focus on facilitating limb movement; 2) CPG ACTIVATION: sufficient weight-bearing is maintained (typically 20-40% body weight supported → 60-80% normal body weight on the legs), which is enough to activate the lumbar CPG networks; 3) NORMAL GAIT PATTERN: the treadmill maintains a consistent speed, and therapists can manually facilitate normal hip extension and knee

flexion during the gait cycle; 4) INTENSIVE PRACTICE: more steps per session are possible compared to overground gait with maximum assistance; 5) CARDIOVASCULAR: even partial weight-bearing gait provides significant cardiovascular exercise. For complete SCI: useful for therapeutic exercise even if functional ambulation is not the goal.

PEDIATRIC NEUROLOGY

87. Primitive reflexes in infants are expected to be INTEGRATED (disappear) by approximately which age?

A. Birth

B. 4-6 months of age for most (Moro, rooting, palmar grasp) — persistence beyond 6-12 months may indicate neurological dysfunction such as cerebral palsy

C. 18 months

D. 3 years

✓ Answer: B

💡 **Rationale & Explanation:**

Primitive reflex integration timeline: MORO REFLEX (startle response): emerges at birth, integrated by ~4-6 months; ROOTING REFLEX: present at birth, integrated ~3-4 months; PALMAR GRASP REFLEX: birth, integrated ~3-6 months; TONIC LABYRINTHINE REFLEX (TLR — extension in supine, flexion in prone): birth, integrated ~4-6 months; ASYMMETRIC TONIC NECK REFLEX (ATNR — 'fencer' reflex): birth, integrated ~4-6 months; SYMMETRIC TONIC NECK REFLEX (STNR): 4-6 months, integrated ~9-12 months. PERSISTENCE of primitive reflexes beyond expected integration = possible CP, TBI, or other neurological dysfunction. In CP: persistence of ATNR interferes with midline activities; TLR persistence disrupts sitting and standing posture. PT focuses on facilitating higher-level postural reactions (righting, equilibrium) that normally REPLACE the primitive reflexes.

NEUROLOGICAL ASSESSMENT

88. The 'Sensory Integration' subtests of the SOMATOSENSORY EVOKED POTENTIAL (SSEP) are used in neurological PT to:

A. Measure muscle strength

B. Assess the INTEGRITY OF SENSORY PATHWAYS (dorsal columns, medial lemniscus, thalamus, sensory cortex) — SSEPs are prolonged or absent when these pathways are damaged (MS, SCI, peripheral neuropathy)

C. Assess vision

D. Test balance only

✓ Answer: B

💡 **Rationale & Explanation:**

SSEP (Somatosensory Evoked Potential): an electrodiagnostic study where a peripheral nerve (median, ulnar, tibial, peroneal) is electrically stimulated and the response is recorded at the spinal cord, brainstem, and cortex. Prolonged SSEP latency or absent response indicates impaired SENSORY PATHWAY conduction. Applications: Intraoperative monitoring during spinal surgery (real-time spinal cord monitoring); Diagnosis of MS (subclinical sensory pathway demyelination); Assess severity of SCI sensory involvement (predicts sensory recovery); Peripheral neuropathy assessment. PT relevance: SSEP findings help explain: a patient's sensory deficits (dorsal column impairment → impaired proprioception + vibration); predict functional recovery; guide sensory retraining goals. Combined with motor evoked potentials (MEPs) and nerve conduction studies = comprehensive neuroelectrophysiological assessment.

NEUROLOGICAL REHABILITATION

89. In the rehabilitation of stroke-related DYSPHAGIA (swallowing difficulty), the PT's primary role is:

A. Prescribing oral medications

B. SAFE SWALLOWING STRATEGIES and positioning during eating — while the SLP manages the specific swallowing treatment; PT contributes head positioning, truncal alignment, and upright sitting support during meals

C. Performing videofluoroscopy

D. Tube feeding management

✓ Answer: B

💡 **Rationale & Explanation:**

PT contribution to dysphagia rehabilitation: DYSPHAGIA (difficulty swallowing) after stroke occurs in up to 50% of acute stroke patients. While the Speech-Language Pathologist (SLP) is the PRIMARY professional for swallowing assessment and treatment (including videofluoroscopic swallowing study interpretation, Frazier free water protocol, swallowing maneuvers), the PT contributes: 1) POSITIONING: optimal trunk alignment in sitting for safe swallowing (upright posture, chin tuck position); 2) HEAD AND NECK POSITIONING: the PT ensures the patient can maintain the recommended head/chin position during eating; 3) SEATING SUPPORT: if trunk control is impaired, proper adaptive seating from PT allows safe upright positioning for eating; 4) EARLY MOBILIZATION: upright posture and early mobilization improve respiratory function, which supports safer swallowing. PT + SLP + nursing teamwork = safest dysphagia management.

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90. Which motor control theory BEST explains why random practice produces BETTER LONG-TERM MOTOR LEARNING than blocked practice?

A. Reflex-hierarchy theory

B. The CONTEXTUAL INTERFERENCE EFFECT (Shea and Morgan) — random practice requires motor plan reconstruction on each repetition, leading to deeper processing and more robust long-term memory compared to repeated identical practice

C. Neuro-developmental treatment theory

D. General motor program theory alone

✓ Answer: B

💡 **Rationale & Explanation:**

Contextual interference effect (Shea and Morgan, 1979): BLOCKED PRACTICE (same task repeatedly before moving to the next) produces BETTER IMMEDIATE PERFORMANCE during practice (appears to learn faster). RANDOM PRACTICE (tasks practiced in varied order) produces SUPERIOR PERFORMANCE on a RETENTION TEST (days later) and TRANSFER TEST (novel variant). Explanation: random practice forces the learner to RECONSTRUCT the motor plan on each repetition (the previous attempt's solution is not available in working memory) → MORE COGNITIVE EFFORT → MORE ELABORATE MEMORY TRACE → better long-term retention. In clinical PT: vary practice conditions rather than repeating the same transfer from the same chair height over and over. Vary: height, surface texture, lighting, speed, direction, concurrent tasks. This drives better neuroplasticity and functional generalization.

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91. **'Spasticity' differs from 'rigidity' in that:**

A. They are clinically identical

B. SPASTICITY is VELOCITY-DEPENDENT (resistance increases with FASTER passive movement — reflects hyperactive stretch reflex); RIGIDITY is VELOCITY-INDEPENDENT (constant resistance throughout the entire range regardless of speed — from basal ganglia pathology in PD)

C. Spasticity affects proximal muscles only

D. Rigidity only affects distal muscles

✓ **Answer: B**

💡 **Rationale & Explanation:**

Spasticity vs. rigidity distinction: SPASTICITY: VELOCITY-DEPENDENT resistance to passive movement — the faster you move the limb, the more resistance you feel (like pushing a door that resists more with speed). Caused by: UMN lesion → hyperactive tonic stretch reflex. Tested: Modified Ashworth Scale, spasticity testing at various velocities. RIGIDITY: VELOCITY-INDEPENDENT (constant resistance at all speeds, in all directions) — like bending a lead pipe (lead-pipe rigidity)

or cogwheeling (cogwheel rigidity = tremor superimposed on lead-pipe rigidity). Caused by: BASAL GANGLIA dysfunction in Parkinson's disease. Treatment differs: Spasticity = stretching, splinting, botox, baclofen; Rigidity = dopaminergic medications, LSVT-BIG, manual therapy. Key clinical test: does resistance change with speed? Yes = spasticity; No = rigidity.

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92. The 'SMART' approach to goal-writing for a stroke patient in a Philippine rehabilitation center might look like:

A. Patient will improve arm function

B. Patient will demonstrate independent wheelchair propulsion for 20 meters on a flat surface without spilling fluid from a cup held in the lap within 3 weeks of rehabilitation admission

C. Patient will be better

D. Patient will do exercises daily

✓ Answer: B

💡 Rationale & Explanation:

SMART goal example for stroke: 'Patient will demonstrate INDEPENDENT wheelchair propulsion for 20 METERS on a FLAT SURFACE, without spilling fluid from a cup held in the lap (dual-task challenge), within 3 WEEKS of rehabilitation admission.' Breaking it down: Specific = wheelchair propulsion + dual task + 20 meters flat; Measurable = 20 meters, no spill, independent; Achievable = reasonable for a patient with hemi-paresis who can use one arm; Relevant = prepares the patient for return to home (navigating corridors, carrying objects); Time-bound = within 3 weeks. This goal integrates motor function (wheelchair propulsion) with a functional context (carrying a cup) and a clear timeline — demonstrating the biopsychosocial, functional, and patient-centered PT approach. Goals should ALWAYS be meaningful to the PATIENT — not just clinically convenient for the therapist.

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93. 'Botulinum toxin (BoNT-A) injection' for post-stroke upper extremity spasticity is MOST effective when:

A. Injected immediately after stroke

B. Combined with INTENSIVE REHABILITATION (stretching, splinting, functional task practice) starting within 1-2 weeks of injection — the 'window of opportunity' for functional gains is during the period of reduced tone (3-6 months)

C. Injected once and not repeated

D. Given only in the non-affected limb

✓ Answer: B

💡 **Rationale & Explanation:**

Botulinum toxin in stroke spasticity: BoNT-A temporarily reduces spasticity for 3-6 months by blocking acetylcholine release at the neuromuscular junction → the spastic muscle is temporarily weakened. This creates a 'WINDOW OF OPPORTUNITY' — reduced tone allows: STRETCHING and SERIAL CASTING to increase passive ROM (that was previously prevented by spasticity); SPLINTING to maintain the gained range; FUNCTIONAL TASK PRACTICE — with reduced spasticity, the patient can better access and practice voluntary movement. Without rehabilitation during this window: the tone reduction is largely wasted (temporary benefit only). WITH intensive rehabilitation: functional gains can persist even after the toxin wears off (due to learned motor recovery). Evidence: most BoNT-A stroke trials show GREATER FUNCTIONAL BENEFIT when combined with PT.

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94. In the rehabilitation of a patient with CEREBELLAR ATAXIA, the most appropriate exercise approach is:

A. High-speed dynamic movements

B. SLOW, CONTROLLED, WEIGHTED EXERCISES combined with task-specific training — using wrist/ankle weights to reduce oscillation, and practicing functional tasks with gradual reduction of external support and visual feedback

C. Sensory deprivation training

D. Passive ROM only

✓ Answer: B

💡 **Rationale & Explanation:**

Cerebellar ataxia rehabilitation: the cerebellum is responsible for COORDINATION, TIMING, and SMOOTH MOVEMENT. Without it: dysmetria, intention tremor, ataxic gait, dysdiadochokinesia, dysarthria. REHABILITATION principles: 1) WEIGHTED LIMBS: small weights at wrists/ankles dampen intention tremor by increasing limb inertia — reducing amplitude of oscillation; 2) SLOW CONTROLLED MOVEMENT: practice tasks slowly and precisely before attempting speed; 3) FRENKEL'S EXERCISES: highly structured coordination exercises developed specifically for sensory and cerebellar ataxia — performed slowly, with visual feedback, progressing to eyes closed; 4) TASK SPECIFICITY: practice functional tasks (reaching, writing, walking) in a controlled way; 5) VISUAL FEEDBACK: use visual targets and mirrors initially, reduce as control improves; 6) TREADMILL with support: reduces fall risk during gait training.

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95. The 'Stroke Rehabilitation Evidence-Based Practice' (SREBP) recommends which type of upper extremity intervention has the STRONGEST evidence?

A. Neurodevelopmental treatment (Bobath) alone

B. REPETITIVE TASK-SPECIFIC TRAINING — intensive practice of arm use in functional tasks (reaching, grasping, lifting, manipulating objects) combined with constraint-induced movement therapy for appropriate patients — has Level 1a evidence

C. Passive ROM only

D. Hot packs to the arm

✓ **Answer: B**

💡 **Rationale & Explanation:**

Strongest evidence for post-stroke upper extremity recovery: LEVEL 1a (systematic review of RCTs): REPETITIVE TASK-SPECIFIC TRAINING (RTST) — practiced with sufficient intensity (100s of repetitions per session) is the primary driver of upper extremity recovery. CONSTRAINT-INDUCED MOVEMENT THERAPY (CIMT) for appropriate patients (≥10° wrist extension) — Level 1a for improving arm function

in chronic stroke. ROBOT-ASSISTED TRAINING — Level 1 evidence for improving arm motor function; particularly useful for increasing repetition dose. NEUROMUSCULAR ELECTRICAL STIMULATION (NMES) to the wrist extensors — Level 1a for improving wrist and hand function. NDT/BOBATH: when used without task-specific practice, has Level 2 evidence — less effective than task-specific approaches. The common thread: REPETITION + TASK SPECIFICITY + APPROPRIATE CHALLENGE = neuroplasticity.

NEUROLOGICAL ASSESSMENT

96. The 'Berg Balance Scale' was specifically designed for:

A. Children with CP

B. Elderly patients and those with neurological conditions — particularly STROKE and OLDER ADULTS WITH FALL RISK — to assess static and dynamic balance during functional activities

C. Healthy athletes

D. Patients with vestibular disorders primarily

✓ Answer: B

💡 Rationale & Explanation:

Berg Balance Scale (BBS) design and applications: the BBS was developed by Katherine Berg (1989) specifically for ELDERLY patients and those with neurological conditions (primarily STROKE). The 14 items reflect real-world functional balance tasks: sitting and standing in various conditions, transfers, turning, reaching, picking up objects. It is MOST VALIDATED for: STROKE (excellent reliability, responsiveness, predictive validity for falls); ELDERLY (falls prediction, fall prevention program outcomes); MULTIPLE SCLEROSIS, PARKINSON'S DISEASE (widely used, normative data available). Also used in: TBI, SCI (limited use for ambulatory SCI patients), vestibular disorders. In the Philippines, the BBS is the most widely used balance assessment in stroke rehabilitation — it is virtually required knowledge for the PRC PT boards.

NEUROLOGICAL REHABILITATION

97. 'Mental practice' (motor imagery) in neurological rehabilitation is used as an ADJUNCT to physical practice because:

A. It replaces physical practice entirely

B. Imagining movement activates SIMILAR NEURAL CIRCUITS to actual movement (demonstrated by neuroimaging) — contributing to cortical reorganization and motor recovery, particularly when physical practice is limited by weakness or pain

C. It is the most powerful intervention

D. It only works for athletes

✓ Answer: B

💡 **Rationale & Explanation:**

Mental practice / Motor imagery: imagining performing a movement activates overlapping neural networks (premotor cortex, supplementary motor area, basal ganglia, cerebellum) to actual movement execution — 'the brain doesn't know the difference between imagining and doing' (at the neural activation level). Applications: 1) STROKE — particularly for hands with too little voluntary movement for physical practice; combined with physical practice improves UE function better than physical practice alone (Level 2 evidence); 2) POST-SURGICAL REHABILITATION — imagining exercises during immobilization reduces strength loss; 3) CHRONIC PAIN — graded motor imagery for CRPS (sequence: left/right hand recognition → imagined movements → mirror therapy). Protocol: 15-20 minutes of FIRST-PERSON (internal) imagery of functional tasks — vividly imagined in real-time speed. Kinesthetic imagery (feeling the movement) is more effective than visual imagery.

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98. The 'Massed practice' vs. 'distributed practice' decision in motor learning for stroke rehabilitation:

A. Massed practice is always superior

B. DISTRIBUTED PRACTICE (rest periods between practice blocks) generally produces superior long-term learning compared to massed practice (continuous practice without rest) — though massed practice has some evidence in early stroke when the window for neuroplasticity is narrow

C. Both are completely equivalent

D. Neither is effective for stroke

✓ Answer: B

💡 **Rationale & Explanation:**

Massed vs. distributed practice: MASSED PRACTICE: many repetitions with minimal rest → performance may improve rapidly within the session but fatigue limits learning efficiency; risk of overuse injury; may not optimize consolidation of motor memories. DISTRIBUTED PRACTICE: practice periods separated by rest intervals → allows consolidation of motor memory traces between practice bouts; better transfer and long-term retention; less fatiguing. CLINICAL APPLICATION: in stroke rehabilitation, there is some evidence that INTENSIVE EARLY PRACTICE (massed practice in the first weeks post-stroke) may be beneficial due to the heightened neuroplasticity window. However, for most conditions, distributed practice with inter-session rest is preferred. PRACTICAL: schedule rehabilitation sessions so the patient has adequate recovery time (not two 4-hour sessions back-to-back).

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99. 'Locomotor training' in incomplete SCI (ASIA C-D) using a treadmill with body weight support and manual facilitation is most effective when:

A. Started at 12 months post-injury

B. Started EARLY (within the first 3-6 months post-injury) when spinal cord neuroplasticity is highest — the treadmill provides rhythmic, afferent input to the lumbar CPG that may re-establish locomotor pattern generation

C. Combined with complete immobilization

D. Used only in complete SCI

✓ Answer: B

💡 **Rationale & Explanation:**

Timing of locomotor training in incomplete SCI: the window of maximum spinal cord neuroplasticity is approximately the FIRST 6 MONTHS post-injury — the spinal cord CPG networks are most responsive to afferent input from weight-bearing locomotion during this period. Evidence: locomotor training (BWSTT, Lokomat robotic) started early in ASIA C-D patients shows greater improvements in walking speed, independence, and distance than when started later. The rhythmic afferent input from treadmill stepping: activates CPG circuits in the lumbar cord; promotes synapse strengthening and plasticity; combined with supraspinal reorganization in incomplete injuries. Even in complete SCI, early locomotor training provides physiological benefits (bone density, circulation, muscle mass, bowel function) even without ambulation recovery.

STROKE REHABILITATION

100. Which of the following IS a contraindication to tPA (alteplase) thrombolysis in acute ischemic stroke?

A. Onset within 4.5 hours

B. Recent major surgery within 14 days, active bleeding, hemorrhagic stroke (on CT scan), or BP >185/110 that cannot be controlled

C. Mild neurological deficits

D. NIHSS score <4

✓ **Answer: B**

💡 **Rationale & Explanation:**

tPA contraindications (PT must recognize red flags for acute stroke): tPA (tissue plasminogen activator) is the only FDA-approved thrombolytic for acute ischemic stroke (within 3-4.5 hours of onset). ABSOLUTE CONTRAINDICATIONS: hemorrhage on CT; recent major surgery (<14 days); active internal bleeding; prior intracranial surgery/trauma (<3 months); prior stroke within 3 months; very high

BP (>185/110) not controllable; platelet count <100,000; anticoagulant use with high INR. PT RELEVANCE: recognizing the acute stroke presentation and understanding the treatment window is critical for PT professionals. A patient presenting with sudden hemiplegia, facial droop, aphasia = CALL EMERGENCY SERVICES immediately. The faster the treatment, the better ('time is brain'). PT should know the FAST mnemonic: Face drooping, Arm weakness, Speech difficulty, Time to call emergency.

NEUROLOGICAL REHABILITATION

101. The 'NIHSS' (National Institutes of Health Stroke Scale) assesses:

A. Only motor function after stroke

B. STROKE SEVERITY across 11 domains: consciousness, gaze, visual fields, facial palsy, arm/leg motor, limb ataxia, sensory, language, dysarthria, extinction/neglect — scored 0-42 (0 = no deficit, higher = more severe stroke)

C. Physical therapy function

D. Balance only

✓ Answer: B

💡 Rationale & Explanation:

NIHSS: the most widely used clinical stroke severity scale. 11 items, scored 0-42. CLASSIFICATION: 0 = no stroke; 1-4 = minor stroke; 5-15 = moderate; 15-20 = moderate-severe; >20 = severe stroke. Items: Level of consciousness (3 items); Gaze; Visual fields; Facial palsy; Arm motor (2 items — right and left); Leg motor (2 items); Limb ataxia; Sensory; Language (aphasia); Dysarthria; Extinction and neglect. PT relevance: the NIHSS score at admission predicts: rehabilitation potential, likely deficits requiring PT attention, length of stay, and functional outcome. A patient with NIHSS 15+ will likely need intensive multidisciplinary rehabilitation. The NIHSS guides PT treatment intensity and goals in the acute phase.

NEUROLOGICAL ASSESSMENT

102. The 'MOCA' (Montreal Cognitive Assessment) screens for mild cognitive impairment (MCI) with:

A. 10 items, normal ≥8/10

B. 30-item assessment: visuospatial/executive, naming, memory, attention, language, abstraction, delayed recall, orientation — score ≥26/30 = normal; 18-25 = mild cognitive impairment; <17 = moderate impairment

C. 5 items only

D. Blood tests

✓ Answer: B

💡 **Rationale & Explanation:**

MoCA (Montreal Cognitive Assessment, Nasreddine 2005): more sensitive than MMSE for detecting MILD COGNITIVE IMPAIRMENT (MCI). 30 total points. Domains: VISUOSPATIAL/EXECUTIVE (trail-making, cube copy, clock drawing = 5 pts); NAMING (3 animals = 3 pts); MEMORY (5 words repeated, not scored until delayed recall = 5 pts); ATTENTION (digit span, serial 7s, vigilance = 6 pts); LANGUAGE (sentence repetition, verbal fluency = 3 pts); ABSTRACTION (similarities = 2 pts); DELAYED RECALL (5 words from earlier = 5 pts); ORIENTATION (date, month, year, day, place, city = 6 pts). Add 1 point if ≤12 years education. Normal: ≥26/30. MoCA detects early dementia and MCI better than MMSE because it includes executive function and visuospatial tests. Essential for post-stroke and TBI cognitive screening in PT.

NEUROLOGICAL REHABILITATION

103. The 'Fugl-Meyer Assessment Upper Extremity' (FMA-UE) maximum score is:

A. 100 points

B. 66 POINTS — testing 33 items each scored 0-2 (0 = cannot perform, 1 = partial, 2 = complete) covering reflexes, flexor synergy, extensor synergy, combined synergy movements, wrist and hand function, and coordination

C. 50 points

D. 26 points

✓ Answer: B

💡 **Rationale & Explanation:**

FMA-UE details: 66 POINTS MAXIMUM for upper extremity (33 items × 2 points each). Structure: SHOULDER/ELBOW/FOREARM: A. Reflexes (2 pts); B. Flexor synergy (12 pts); C. Extensor synergy (6 pts); D. Combined movements (6 pts); E. Wrist (10 pts); F. Hand (14 pts); G. Coordination/speed (6 pts). Total UE = 66. FMA-LE maximum = 34 pts. FMA TOTAL = 226 pts (including balance, sensory, ROM/pain). MCID for FMA-UE: ~4-7 points (depends on baseline severity). The FMA-UE is the criterion standard for measuring post-stroke motor impairment in research and many clinical settings. It follows the Brunnstrom stages — reflexes and synergistic movements are tested first, progressing to selective independent movements and coordination.

├— SPINAL CORD INJURY

104. In SCI, 'syringomyelia' (syrinx) is a late complication characterized by:

A. Infection of the cord

B. A FLUID-FILLED CAVITY within the SPINAL CORD that slowly EXPANDS, causing progressive neurological deterioration ABOVE the previous injury level — ascending loss of pain/temperature sensation, new weakness, pain

C. Increased spasticity only

D. Autonomic dysreflexia

✓ **Answer: B**

💡 **Rationale & Explanation:**

Post-traumatic syringomyelia: a syrinx (fluid-filled cyst) forms within the spinal cord, typically at or above the injury level. It slowly expands, compressing and destroying adjacent cord tissue. Onset: months to years after SCI. RED FLAGS: new ASCENDING neurological deficits (sensory loss traveling upward), new pain (especially cape-like pain in upper extremities in thoracic injury patients), increased spasticity, sweating changes above the injury level, or previously stable patient developing new deficits. Diagnosis: MRI shows the cystic cavity within the cord. Treatment: surgical drainage/shunting if symptomatic. PT RELEVANCE: any new or progressive neurological deterioration in a known SCI patient should be evaluated for syringomyelia with urgent medical referral before continuing rehabilitation.

NEUROLOGICAL ASSESSMENT

105. The 'dynamic gait index' (DGI) assesses:

A. Static balance only

B. Walking ability under CHANGING CONDITIONS — 8 gait tasks including changing speed, horizontal and vertical head movements, stepping over/around obstacles, stairs, and pivot turns — scored 0-3 each, max 24 — ≤19 = fall risk

C. Upper extremity function

D. Cognitive function

✓ **Answer: B**

💡 **Rationale & Explanation:**

Dynamic Gait Index (Shumway-Cook & Woollacott): 8 gait tasks: 1) Gait on level surface; 2) Change in gait SPEED (faster/slower on command); 3) HORIZONTAL head turns while walking; 4) VERTICAL head turns

while walking (up/down); 5) Pivot and STOP; 6) Step OVER obstacle; 7) Step AROUND obstacles; 8) STAIRS. Each scored 0-3 (0 = severe impairment, 3 = normal). Total 0-24. FALL RISK: ≤19/24. The DGI challenges DUAL-TASK and ADAPTIVE balance — relevant to real-world walking demands. Particularly useful for: vestibular rehabilitation, stroke, TBI, PD, MS, fall prevention programs. The 4-item DGI (DGI-4) is a quick screen. The Functional Gait Assessment (FGA) is an updated version with better ceiling effects.

NEUROLOGICAL REHABILITATION

106. 'Stroke unit' care (dedicated inpatient stroke rehabilitation unit with coordinated multidisciplinary team) compared to general ward care:

A. Has no proven benefit

B. Has the STRONGEST EVIDENCE in stroke rehabilitation — reduces death, dependency, and institutional care by ~18% each, with absolute risk reduction of ~5% compared to general ward care — the single most effective stroke intervention

C. Is only available in developed countries

D. Is only for minor strokes

✓ Answer: B

💡 **Rationale & Explanation:**

Stroke unit evidence: the Cochrane Systematic Review of Stroke Unit Trialists (multiple updates) provides the strongest evidence base in stroke care. Stroke units vs. general wards: ABSOLUTE RISK REDUCTION: death reduced by ~5%; death or institutionalization reduced by ~18%; death or dependency reduced by ~18%. This benefit applies to ALL stroke subtypes and severities. What makes stroke units work: 24-hour specialist nursing; early and intensive PT, OT, SLP; coordinated multidisciplinary team meetings; standardized protocols; early mobilization; complication prevention. The stroke unit effect is LARGER than any single drug therapy or individual intervention for

stroke. PT students must understand why the SYSTEM of care matters, not just individual therapy techniques.

NEUROLOGICAL ASSESSMENT

107. The 'ASIA motor score' is calculated by summing the MMT grades of 10 key muscles per side. What is the MAXIMUM upper extremity motor score?

A. 20

B. 25 — 5 muscles each side (C5-T1), each graded 0-5 = maximum 5×5 = 25 points per side = 50 total UE

C. 50

D. 10

✓ Answer: C

💡 Rationale & Explanation:

ASIA Motor Score breakdown: UPPER EXTREMITY (per side): C5 = elbow flexors (0-5); C6 = wrist extensors (0-5); C7 = elbow extensors (0-5); C8 = finger flexors (0-5); T1 = finger abductors (0-5). Maximum per side = 25. Total UE = 50. LOWER EXTREMITY (per side): L2 = hip flexors; L3 = knee extensors; L4 = ankle dorsiflexors; L5 = long toe extensors; S1 = ankle plantarflexors. Maximum per side = 25. Total LE = 50. TOTAL MOTOR SCORE maximum = 100 (50 UE + 50 LE). A motor score of 100 = all key muscles normal bilaterally. This quantification is essential for classifying SCI severity and tracking recovery over time. Important: the ASIA motor score only evaluates 10 key muscles per side — it does NOT capture ALL motor deficits, particularly trunk and proximal muscles not included in the key muscle set.

NEUROLOGICAL REHABILITATION

108. 'Virtual reality' (VR) rehabilitation for post-stroke upper extremity uses which primary mechanism?

A. Pain distraction

B. INTENSIVE, TASK-SPECIFIC, REPETITIVE practice in an ENGAGING VIRTUAL ENVIRONMENT — motivating patients to perform hundreds more repetitions per session than traditional therapy, driving the neuroplasticity needed for motor recovery

C. Balance only

D. Passive ROM

✓ Answer: B

💡 Rationale & Explanation:

VR rehabilitation mechanisms in stroke: 1) REPETITION: VR games encourage hundreds of UE repetitions per session — far exceeding what traditional tabletop therapy achieves; 2) TASK-SPECIFICITY: VR tasks (reaching, grasping, throwing virtual objects) mimic real functional activities; 3) FEEDBACK: real-time visual feedback about movement quality; 4) ENGAGEMENT/MOTIVATION: game elements (scores, levels) maintain motivation and attention; 5) VARIABLE PRACTICE: easy to vary task demands (contextual interference); 6) SAFE: can practice tasks (like reaching high shelves or crossing roads) that would be unsafe in reality. Evidence: commercial VR systems (Nintendo Wii, Xbox Kinect) and purpose-built rehabilitation VR systems show moderate evidence for improving UE function and balance post-stroke. Most effective when combined with conventional PT. Not a replacement for therapist-guided practice.

├— SPINAL CORD INJURY

109. The 'ASIA Impairment Scale' distinguishes between 'COMPLETE' and 'INCOMPLETE' injury primarily by:

A. The presence or absence of voluntary movement

B. Whether SENSORY AND MOTOR FUNCTION is preserved in the SACRAL SEGMENTS S4-S5 — preserved sacral sensation (perianal sensation) and/or voluntary anal sphincter contraction = INCOMPLETE injury (AIS B, C, D)

C. The level of injury

D. Whether the patient can walk

✓ **Answer: B**

💡 **Rationale & Explanation:**

AIS complete vs. incomplete sacral criterion: the KEY distinguishing feature between AIS A (complete) and AIS B/C/D (incomplete) is preservation of SACRAL SEGMENT FUNCTION (S4-S5): SACRAL SPARING criteria: (1) Perianal SENSATION (light touch or pin prick at S4-S5 dermatome — tested at the anal mucocutaneous junction); OR (2) Voluntary ANAL SPHINCTER CONTRACTION on rectal examination. If EITHER is present = sacral sparing = INCOMPLETE injury (AIS B minimum). Why sacral segments matter: the sacral fibers run in the most CENTRAL part of the cord — if any function is preserved here, it means the cord is not completely disrupted, and there is potential for further neurological recovery. AIS A (no sacral sparing) = complete injury = much less likely to have significant neurological recovery than incomplete injuries.

NEUROLOGICAL REHABILITATION

110. The 'mirror neuron system' (MNS) is proposed to contribute to motor learning and rehabilitation because:

A. It is the system that controls reflexes

B. Mirror neurons fire BOTH when performing an action AND when OBSERVING someone else perform the same action — providing a neural substrate for learning through observation, imitation, and social modeling

C. It mirrors the spinal cord in the brain

D. It controls proprioception

✓ **Answer: B**

💡 **Rationale & Explanation:**

Mirror neurons (discovered by Rizzolatti et al. in macaques, 1992): neurons in the premotor and parietal cortex that activate during BOTH execution and OBSERVATION of goal-directed actions. REHABILITATION IMPLICATIONS: OBSERVATION-BASED LEARNING: watching the therapist perform a movement activates similar neural circuits as actually performing it — supports learning by observation; ACTION OBSERVATION THERAPY (AOT): patients watch videos of functional actions, then practice the same actions — shows evidence for improved UE function post-stroke; IMITATION: the MNS supports learning by imitation; MOTOR IMAGERY: mental simulation of movement also activates MNS-related circuits. Evidence for AOT in stroke: moderate (Level 2) — combined with practice is more effective than practice alone. The MNS provides a neurological rationale for DEMONSTRATION, OBSERVATION, and IMITATION in PT instruction.

NEUROLOGICAL ASSESSMENT

111. The 'STREAM' (Stroke Rehabilitation Assessment of Movement) measures:

A. Cognitive function

B. Upper extremity voluntary movements, lower extremity voluntary movements, and basic mobility — specific to EARLY STROKE REHABILITATION, sensitive to small changes in the acute/subacute period

C. Spasticity only

D. Balance only

✓ **Answer: B**

💡 **Rationale & Explanation:**

STREAM (Daley et al., 1997): a standardized test of VOLUNTARY MOVEMENT and BASIC MOBILITY after stroke. Three subscales: UPPER EXTREMITY voluntary movement (30 items); LOWER EXTREMITY voluntary movement (30 items); BASIC MOBILITY (10 items — rolling, sitting, standing, walking). Total 100 points. STREAM is: sensitive to SMALL CHANGES in early stroke recovery (more sensitive than the Barthel for acute-phase improvement); can be used even when a patient cannot stand or walk (the LE and mobility subscales start from bed mobility); useful for setting realistic goals in the acute rehabilitation phase. Used in Canadian and international stroke rehabilitation research. The STREAM complements the FMA (which measures impairment) by also including mobility tasks (which are closer to the activity level of the ICF).

NEUROLOGICAL REHABILITATION

112. 'Standing frame' training for patients with complete SCI is beneficial because:

A. It improves voluntary leg movement

B. BONE DENSITY MAINTENANCE (weight-bearing reduces osteoporosis below the injury level), JOINT ALIGNMENT AND CONTRACTURE PREVENTION, CARDIOVASCULAR EFFECTS, BOWEL FUNCTION IMPROVEMENT, and PSYCHOLOGICAL BENEFITS — even without neurological recovery

C. It is equivalent to ambulation

D. Only for incomplete SCI

✓ Answer: B

💡 **Rationale & Explanation:**

Standing frame benefits in complete SCI: despite no functional ambulation, daily or regular standing (using a standing frame, tilt table, or standing wheelchair) provides: 1) BONE DENSITY: weight-bearing stimulates osteoblasts — reduces osteoporosis rate below the injury level (SCI patients have high hip/distal femur fracture risk); 2) JOINT

ALIGNMENT: maintains ankle/knee/hip alignment, prevents contractures; 3) CARDIOVASCULAR: mild hemodynamic benefits; 4) BOWEL/BLADDER: upright position may improve bowel transit and bladder emptying; 5) SPASTICITY REDUCTION: sustained standing stretch can temporarily reduce extensor spasticity; 6) PRESSURE RELIEF: redistributes pressure from buttocks; 7) PSYCHOLOGICAL: being upright at eye level improves interaction and mood. Recommended: 30-60 minutes/day standing for complete SCI patients. Equipment: EasyStand, Rifton, or tilt-in-space wheelchairs with standing function.

├— PEDIATRIC NEUROLOGY

113. In pediatric rehabilitation, 'constraint-induced movement therapy' (CIMT) for hemiplegic CP is applied:

A. Only after age 10

B. For CHILDREN WITH HEMIPLEGIC CP aged 2+ who have at least minimal hand function — constraining the stronger hand with a cast or mitt for 6-8 hours/day while intensively training the weaker hand with functional tasks

C. For bilateral CP only

D. Without any functional training

✓ Answer: B

💡 **Rationale & Explanation:**

CIMT for pediatric hemiplegic CP (Pediatric CIMT / modified CIMT): similar to adult stroke CIMT, adapted for children. The stronger (less-affected) limb is CONSTRAINED (short arm cast or mitt) during waking hours while the child practices intensive, structured functional activities with the weaker hand. Modified versions: HYBRID CIMT (briefer constraintperiods + bimanual training); HAND-ARM BIMANUAL INTENSIVE THERAPY (HABIT — 90 hours of bimanual task practice without constraint — comparable evidence to CIMT). Evidence: CIMT improves QUANTITY of limb use and quality of movement in

hemiplegic CP children. Age: effective from 2 years old. Important: must adapt for children — use play-based activities, family training for home carryover. CIMT is the most evidence-based UE intervention for hemiplegic CP.

NEUROLOGICAL REHABILITATION

114. 'Selective serotonin reuptake inhibitors' (SSRIs) such as fluoxetine are being studied in stroke rehabilitation as NEUROPLASTICITY ENHANCERS because:

A. They relieve post-stroke depression only

B. They may ENHANCE CORTICAL EXCITABILITY AND NEUROPLASTICITY independent of antidepressant effects — the FLAME trial showed fluoxetine 20 mg/day for 3 months improved motor recovery in ischemic stroke patients with hemiplegia

C. They reduce spasticity

D. They improve sleep only

✓ Answer: B

💡 **Rationale & Explanation:**

SSRIs as neuroplasticity enhancers in stroke (FLAME trial, 2011; FOCUS trial, 2019): FLAME (French): fluoxetine significantly improved motor recovery at 3 months compared to placebo — exciting results. FOCUS (UK, 2019): fluoxetine did NOT improve independence on the mRS — a large pragmatic trial showing less benefit. Mechanism: serotonin may enhance MOTOR CORTEX EXCITABILITY, synaptogenesis, and neuroplasticity through multiple pathways. Current status: MIXED EVIDENCE — not standard of care but areas of ongoing research. PT RELEVANCE: understanding pharmacological adjuncts to neurological rehabilitation helps PTs discuss the evidence with patients and colleagues. Fluoxetine is appropriate for POST-STROKE DEPRESSION (which is very common — ~30% of patients) regardless of its neuroplasticity effects. A patient's mood and motivation significantly impact PT participation and outcomes.

115. In Parkinson's disease, the 'off' period gait is characterized by:

A. Improved balance and movement

B. SEVERE FREEZING, MARKED FESTINATION, EXTREME BRADYKINESIA — occurring when dopaminergic medication effects are low (at the end of a medication dose); the patient may be unable to initiate or continue walking

C. Good walking speed

D. Normal arm swing

✓ Answer: B

💡 Rationale & Explanation:

PD 'on' and 'off' states: Parkinson's disease patients experience fluctuations related to medication cycles. 'ON' period (adequate dopamine effect): movement is improved, gait is more functional, tremor reduced, facial expression better. 'OFF' period (medication wearing off, typically before next dose): SEVERE motor symptoms return — marked bradykinesia, rigidity, tremor; gait is severely impaired with FREEZING OF GAIT (FOG), extreme festination, very small steps; the patient may be unable to move at all. 'WEARING-OFF PHENOMENON' and 'ON-OFF FLUCTUATIONS' become more common as PD advances. PT SCHEDULING RELEVANCE: always schedule PT sessions during the 'ON' period for maximum participation — typically 30-60 minutes after dopaminergic medication. Communicate with the patient and caregivers about their medication schedule. Advanced PD therapy (apomorphine pump, DBS) can smooth fluctuations.

├— NEUROLOGICAL ASSESSMENT

116. The 'MRC sumscore' in Guillain-Barré syndrome (GBS) during recovery uses:

A. FIM scores

B. SUM of MMT grades for 6 muscles bilaterally (shoulder abduction, elbow flexion, wrist extension, hip flexion, knee extension, ankle

dorsiflexion) — maximum 60 — correlates with function and predicts return to ambulation

C. ASIA scale

D. Barthel index

✓ Answer: B

💡 **Rationale & Explanation:**

GBS MRC Sumscore: 6 key muscles are tested bilaterally on the MRC scale (0-5 each): shoulder abductors, elbow flexors, wrist extensors, hip flexors, knee extensors, ankle dorsiflexors. 6 muscles × 2 sides × 5 maximum = MAXIMUM 60 POINTS. Uses: TRACKING RECOVERY: the MRC sumscore improves as nerve regeneration occurs; PREDICTING AMBULATION: scores ≥48/60 at 4 weeks correlates with walking at 6 months; Research standardization for GBS clinical trials. PT uses the MRC sumscore at each assessment: establish baseline, track recovery trajectory, adjust PT intensity (increase as score improves), and guide discharge planning. GBS rehabilitation: MRC <20 = bed-based PT; 20-40 = wheelchair-based with assisted transfers; 40-50 = assisted ambulation; 50-60 = independent ambulation training.

NEUROLOGICAL REHABILITATION

117. 'Neuromuscular taping' (elastic therapeutic tape) for neurological patients is used primarily for:

A. Providing structural support like rigid tape

B. FACILITATING OR INHIBITING MUSCLE ACTIVATION, IMPROVING SENSORY INPUT AND PROPRIOCEPTION, and SUPPORTING JOINT ALIGNMENT without restricting ROM — particularly for facilitating weak muscles and improving postural alignment in stroke or CP

C. Replacing splinting

D. Pain only

✓ Answer: B

💡 **Rationale & Explanation:**

Neuromuscular/kinesiology tape in neurological PT: unlike rigid strapping tape, elastic therapeutic tape moves with the body and provides: 1) SENSORY FACILITATION: the elastic tension on the skin provides constant tactile sensory input that may enhance body awareness and motor control (proprioceptive facilitation theory); 2) MUSCLE FACILITATION: applied in the direction of muscle action with 15-25% tension to facilitate weak muscles (e.g., tibialis anterior for foot drop, deltoid for shoulder subluxation); 3) MUSCLE INHIBITION: applied against the direction of muscle action with 10-15% tension to reduce hyperactive muscles (e.g., spastic bicep); 4) JOINT SUPPORT: positions joints in more optimal alignment. Applications in neuro PT: shoulder subluxation post-stroke (support glenohumeral joint without restricting movement), foot drop facilitation, scapular positioning in CP. Evidence: weak but emerging for shoulder subluxation and positioning.

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118. The 'Schuell-Jenkins-Jimenez-Pabon' (SJJP) aphasia rehabilitation approach focuses on:

A. Compensatory communication strategies only

B. INTENSIVE STIMULATION of language function through high-volume, repetitive, auditory-based stimulation — the damaged language cortex is activated through intensive input, promoting reorganization and recovery

C. Alternative augmentative communication (AAC)

D. Pharmacotherapy

✓ Answer: B

💡 **Rationale & Explanation:**

Schuell's stimulation approach to aphasia: Hildred Schuell's foundational approach (1950s-60s): 1) AUDITORY STIMULATION is the primary input channel (auditory comprehension is usually less impaired than expression); 2) INTENSIVE STIMULATION — high frequency, repetitive stimulation of language processes; 3) MEANINGFUL RESPONSE — always require a language response; 4) REPETITION until the response is reliable; 5) MULTIPLE MODALITIES —

auditory + visual + reading + writing together. Underlying theory: the brain responds to intensive stimulation by reorganizing — similar to exercise-induced muscle adaptation but for language neural networks. Modern aphasia therapy builds on Schuell's foundations with constraint-induced language therapy (CILT — forces verbal communication, suppresses gesture compensation) and semantic feature analysis. Schuell's approach remains influential in Philippine PT and SLP education.

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119. The 'passive cycle ergometry' for patients with disorders of consciousness (vegetative or minimally conscious state) is used to:

A. Measure cognitive awareness

B. PREVENT DECONDITIONING AND CONTRACTURES, stimulate sensory-motor input (rhythmic proprioceptive input from leg cycling), maintain joint range, and potentially facilitate emergence of consciousness through sensorimotor stimulation

C. Strengthen muscles directly

D. Assess prognosis

✓ Answer: B

💡 **Rationale & Explanation:**

Passive cycling (MOTOmed or similar devices) for DoC patients: patients in vegetative state (VS) or minimally conscious state (MCS) cannot voluntarily exercise. Passive cycling provides: 1) JOINT RANGE maintenance (prevents contractures in the lower extremities); 2) MUSCLE MASS preservation (passive movement stimulates some motor neuron activity via muscle spindle reflexes); 3) CARDIOVASCULAR EFFECTS (passive limb movement modestly increases circulation); 4) SENSORY INPUT: rhythmic proprioceptive input may stimulate arousal and conscious processing; 5) NEUROPLASTICITY stimulus: the repetitive somatosensory input from cycling may promote cortical activation in minimally conscious patients. Emerging evidence suggests combined passive + FES cycling improves spasticity and may facilitate consciousness emergence in MCS patients. Used as part of a comprehensive sensory stimulation

program alongside family presence, familiar voices, and purposeful handling.

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120. The 'Chedoke-McMaster Stroke Assessment' (CMSA) is unique because it:

A. Measures ADL independence

B. Stages STROKE RECOVERY using a 7-stage scale for each body segment (shoulder, arm, hand, leg, foot) + postural reactions + mobility — based on Brunnstrom's recovery framework but with clear criteria

C. Measures cognitive function only

D. Tests spasticity level

✓ Answer: B

💡 **Rationale & Explanation:**

Chedoke-McMaster Stroke Assessment (CMSA, Gowland et al.): a comprehensive stroke assessment with two inventories. IMPAIRMENT INVENTORY: 6 subscales each rated 1-7 (Brunnstrom-based): shoulder impairment; arm impairment; hand impairment; leg impairment; foot impairment; postural control. ACTIVITY INVENTORY: gross motor function items (similar to Barthel). STAGE DESCRIPTIONS: clear behavioral criteria for each stage (1-7) help standardize assessment. Strengths: captures limb-specific recovery rather than whole-body function; directly guides therapeutic interventions (knowing the Brunnstrom stage informs what type of facilitation/task is appropriate); good reliability and validity. CMSA is widely used in Canadian stroke research and is taught in Philippine PT programs as part of neurological assessment.

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121. The 'SMART' approach to post-stroke rehabilitation (self-monitoring, active goal setting, real-world tasks) reflects which motor learning principle?

A. Passive learning

B. ACTIVE, SELF-DIRECTED PARTICIPATION promotes deeper learning, better retention, and higher motivation — aligning with Adult Learning

Theory and motor learning evidence that internal feedback and goal-directed practice produce superior outcomes

C. Blocked practice

D. External focus only

✓ **Answer: B**

💡 **Rationale & Explanation:**

Active vs. passive learning in rehabilitation: patients who are ACTIVE PARTICIPANTS in their rehabilitation (set their own goals, monitor progress, choose meaningful tasks) learn better and maintain gains longer than passive recipients of therapy. ADULT LEARNING THEORY (Knowles): adults are self-directed; learn best through problem-solving related to real-life situations; are internally motivated; need to understand relevance. MOTOR LEARNING EVIDENCE: INTERNAL FOCUS (attention on body movement) vs. EXTERNAL FOCUS (attention on the environmental effect of movement) — external focus generally produces BETTER MOTOR LEARNING (Wulf's constrained action hypothesis). SELF-MONITORING (home diaries, wearable activity trackers) increases adherence to home programs. GOAL-DIRECTED practice: patients who choose personally meaningful functional goals (getting back to cooking, playing with grandchildren) engage more intensely. This philosophy underpins the SMART goals approach in PT documentation.

NEUROLOGICAL ASSESSMENT

122. The 'Tinetti performance-oriented mobility assessment' (POMA) tests:

A. Upper extremity function

B. BALANCE (9 items, 16 points) and GAIT (7 items, 12 points) in older adults — total 28 points; ≤18 = high fall risk; 19-24 = moderate fall risk; 25-28 = low fall risk

C. Cognitive function

D. Spasticity

✓ **Answer: B**

💡 **Rationale & Explanation:**

Tinetti POMA (Performance-Oriented Mobility Assessment, 1986): developed specifically for OLDER ADULTS. Two sections: BALANCE (9 items, 16 points max): sitting balance, arising from chair, standing balance (immediate, attempted eyes closed, turning 360°, balance with nudge, sitting down); GAIT (7 items, 12 points max): gait initiation, step length/height, step symmetry, gait continuity, path deviation, trunk sway, walking stance. Total 28 points. RISK THRESHOLDS: ≤18 = high fall risk (requires urgent intervention); 19-24 = moderate fall risk (monitoring + prevention program); 25-28 = low fall risk (maintenance). The Tinetti POMA predicts fall risk in community-dwelling elderly and nursing home populations. It is simple, requires only a chair, and takes <15 minutes. Widely used in Philippine geriatric PT and in nursing home settings.

NEUROLOGICAL REHABILITATION

123. Post-traumatic amnesia assessment using the 'Westmead PTA Scale' requires:

A. Weekly testing

B. DAILY testing using 12 items including 12 standardized pictures (must be recalled consistently) plus orientation questions — EXIT FROM PTA = correct responses on 3 consecutive days of testing (not just one day)

C. Monthly testing

D. Single session assessment

✓ **Answer: B**

💡 **Rationale & Explanation:**

Westmead PTA Scale: the most widely used PTA scale in rehabilitation. 12 items: face/name recall (3 items — 3 new faces introduced on Day

1, recalled on subsequent days); picture recall (5 items — 5 standardized pictures introduced Day 1, recalled daily); 4 orientation questions (name, date, location, examiner's name). SCORING: 0-12. EXIT FROM PTA CRITERION: patient must score 12/12 on 3 CONSECUTIVE days — one correct day is not sufficient (patients in PTA can have 'islands of lucidity' — correct responses on some days without true emergence from amnesia). Until 3 consecutive correct days: patient remains in PTA and cannot engage in meaningful learning-based rehabilitation. Once PTA resolves: begin formal cognitive rehabilitation, skills training, and community reintegration work.

├— SPINAL CORD INJURY

124. The primary LONG-TERM CAUSE OF DEATH for SCI patients (modern era) is:

A. Pressure ulcers

B. RESPIRATORY DISEASE (pneumonia, respiratory failure) in cervical/high thoracic SCI — and CARDIOVASCULAR DISEASE in all SCI levels (due to inactivity, accelerated cardiovascular risk factors)

C. Autonomic dysreflexia

D. Syringomyelia

✓ Answer: B

💡 **Rationale & Explanation:**

SCI mortality causes: In the MODERN ERA of SCI care (with improved acute management, antibiotics, pressure care), the leading causes of death have shifted: CERVICAL SCI: respiratory complications (pneumonia, respiratory failure) remain the primary cause of premature death; THORACIC/LUMBAR SCI: CARDIOVASCULAR DISEASE has become the leading long-term mortality cause — SCI patients have accelerated cardiovascular risk from: physical inactivity (reduced caloric expenditure), autonomic dysfunction affecting cardiac regulation, dyslipidemia, insulin resistance. Prevention implications:

respiratory management (vaccinations, breathing exercises, FES) for cervical SCI; CARDIOVASCULAR PREVENTION (exercise, diet, weight management, cardiovascular monitoring) for all SCI patients. PT role: promote maximal physical activity level possible, teach pulmonary hygiene, support cardiovascular exercise programs.

NEUROLOGICAL REHABILITATION

125. The 'Agrammatic aphasia' pattern (typical of Broca's aphasia) is characterized by:

A. Fluent speech with word-finding errors

B. NON-FLUENT, telegraphic speech omitting GRAMMATICAL FUNCTION WORDS and MORPHEMES ('man walk store' instead of 'the man walked to the store') with PRESERVED COMPREHENSION

C. Jargon with neologisms

D. Normal prosody

✓ Answer: B

💡 **Rationale & Explanation:**

Broca's aphasia (expressive/agrammatic aphasia): LEFT FRONTAL lesion (Broca's area, BA44-45). SPEECH OUTPUT: NON-FLUENT — reduced spontaneous speech, short utterances, labored; AGRAMMATIC — telegraphic, missing function words (a, the, is), missing morphological endings (-ed, -s, -ing); PROSODY: monotone, missing normal rhythm; REPETITION: impaired; NAMING: impaired; COMPREHENSION: relatively PRESERVED for simple sentences (though impaired for syntactically complex sentences). The patient knows WHAT they want to say but cannot produce it fluently. Compare: WERNICKE'S APHASIA (fluent, grammatically formed but semantically empty/jargon speech, poor comprehension). PT working with Broca's aphasia: use gesture, drawing, AAC devices to supplement communication; familiar topics; short, simple sentences; give the patient time to respond — do not finish their sentences for them.

NEUROLOGICAL ASSESSMENT

126. The 'Nottingham Sensory Assessment' (NSA) for stroke patients measures:

A. Motor function

B. TACTILE SENSATION (light touch, pressure, pin-prick), PROPRIOCEPTION (joint position sense, kinesthesia), STEREOGNOSIS, and BILATERAL SIMULTANEOUS STIMULATION — providing a comprehensive post-stroke sensory profile

C. Balance only

D. Cognitive function

✓ Answer: B

💡 **Rationale & Explanation:**

Nottingham Sensory Assessment (NSA, Lincoln et al.): a standardized sensory testing battery for post-stroke patients. Domains: TACTILE: light touch (cotton wool), pressure (examiner's finger), sharp/dull (pin-prick vs. finger pad) — on 9 body areas; PROPRIOCEPTION: passive joint movement detection (kinesthesia), joint position matching (proprioception) — wrist, elbow, shoulder, knee, ankle; STEREOGNOSIS: object identification by touch alone (with eyes closed); BILATERAL SIMULTANEOUS STIMULATION: detecting whether one or both sides are touched simultaneously (assessing extinction/neglect of sensory stimuli). Scored: absent, impaired, or normal for each modality per area. The NSA is the most comprehensive standardized sensory assessment available for stroke and is recommended in evidence-based practice guidelines. Sensory impairment post-stroke affects: hand function rehabilitation, balance, proprioceptive retraining planning, and safety awareness.

NEUROLOGICAL REHABILITATION

127. In multiple sclerosis rehabilitation, the 'Modified Fatigue Impact Scale' (MFIS) is used because:

A. It measures depression

B. MS FATIGUE is a DISTINCT SYMPTOM from depression or deconditioning fatigue — the MFIS specifically measures the impact of fatigue on PHYSICAL (9 items), COGNITIVE (10 items), and PSYCHOSOCIAL (2 items) functioning — total 84 points (0 = no impact, 84 = maximal impact)

C. It replaces exercise testing

D. It measures spasticity

✓ Answer: B

💡 **Rationale & Explanation:**

MFIS (Modified Fatigue Impact Scale, Fisk et al.): 21 items scored 0-4 each, measuring FUNCTIONAL IMPACT of MS fatigue on: PHYSICAL functioning (activities requiring physical effort); COGNITIVE functioning (concentration, memory, thinking); PSYCHOSOCIAL functioning (participation, social activities). Total 0-84 (0 = fatigue has no impact). MCID: approximately 8-10 points. MS fatigue differs from: normal tiredness (not relieved by rest, worse with heat, associated with neurological mechanisms — demyelination, inflammation, autoimmune cytokines, deconditioning); depression-related fatigue (cognitive-emotional focus); deconditioning fatigue (pure physical deconditioning, responds to exercise training). Why assess it separately? To guide specific interventions: MS fatigue → energy conservation + cooling + appropriate aerobic exercise; deconditioning fatigue → progressive cardiovascular training; depression → CBT + pharmacotherapy.

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128. 'Hydrotherapy (aquatic therapy)' for neurological patients is particularly beneficial because:

A. Water is cold and reduces inflammation

B. WARM WATER (34-36°C) reduces MUSCLE TONE and PAIN, the BUOYANCY allows task practice and movement in patients who cannot bear full body weight on land, HYDROSTATIC PRESSURE provides

sensory stimulation and joint support, and WATER RESISTANCE provides gentle proprioceptive feedback for motor control training

C. Cold water cures neurological deficits

D. It replaces land-based therapy entirely

✓ Answer: B

💡 **Rationale & Explanation:**

Aquatic therapy benefits for neurological conditions: TEMPERATURE (34-36°C): warm water REDUCES MUSCLE TONE (spasticity) and pain — especially beneficial for CP, stroke spasticity, MS. BUOYANCY: patients who are non-ambulatory on land can walk, balance, and perform functional tasks in water — allows earlier functional practice; reduces fall risk during training. HYDROSTATIC PRESSURE: compressive sensory input from all sides provides PROPRIOCEPTIVE and tactile stimulation beneficial for motor control and balance. RESISTANCE: water resistance provides variable, direction-dependent resistance for strengthening. PSYCHOLOGICAL: many patients find the pool environment less threatening, more motivating. Evidence: Level 2 for aquatic therapy in CP, MS, PD, stroke. Special populations: excellent for CP children (reduces spasticity), MS patients (heat sensitivity must be managed — keep water at 28-32°C for MS), PD (improves balance and gait), stroke (supplementary to land-based therapy).

NEUROLOGICAL ASSESSMENT

129. The 'Barthel Index' maximum score of 100 does NOT necessarily indicate:

A. Any problem with ADL performance

B. That the patient can live INDEPENDENTLY IN THE COMMUNITY — a score of 100 means the patient can perform the 10 assessed ADLs independently, but they may still need supervision for complex community tasks (driving, managing finances, cooking complex meals)

C. Any motor function

D. Continence

✓ **Answer: B**

💡 **Rationale & Explanation:**

Barthel Index limitation — score 100 ≠ community independence: a patient can score 100/100 on the Barthel (independent in feeding, bathing, grooming, dressing, bowel, bladder, toilet, transfers, mobility, stairs) AND still require: supervision for community navigation (crossing streets, using public transport); assistance with complex meal preparation; cognitive support (memory deficits may make safe home management unsafe); complex IADLs (instrumental ADLs — managing medications, finances, communication). The Barthel measures BASIC ADLs only. IADL scales (Lawton-Brody, COPM) assess complex community activities. This limitation is important in PT discharge planning — a Barthel of 100 does NOT guarantee safe community discharge without a comprehensive home and community assessment.

├— NEUROLOGICAL REHABILITATION

130. 'HABIT' (Hand-Arm Bimanual Intensive Training) for hemiplegic CP is different from CIMT in that:

A. HABIT is less intensive

B. HABIT does NOT constrain the stronger hand — instead both hands work TOGETHER in 90 hours of intensive BIMANUAL task practice (activities requiring two-hand coordination: opening jars, tying shoelaces, playing board games) — improving bimanual coordination rather than unilateral limb use

C. HABIT uses splinting

D. HABIT is only for adults

✓ **Answer: B**

💡 **Rationale & Explanation:**

HABIT (Gordon et al., Columbia University): an evidence-based intensive therapy for hemiplegic CP that addresses the bimanual

coordination deficit. 90 hours over 2-6 weeks of BIMANUAL (two-handed) TASK PRACTICE. Evidence comparison: CIMT improves AMOUNT of limb use (how often the weaker hand is used) and unilateral task performance. HABIT improves BIMANUAL HAND USE (how well both hands work together) — the most functionally important outcome for daily life. Ideally: CIMT and HABIT may complement each other — CIMT first to establish basic limb use, then HABIT to integrate into functional bimanual use. Both require intensities of 60-90 hours to show significant functional gains. Current evidence: HABIT as effective as CIMT for improving overall hand function, with HABIT showing superior bimanual outcomes. Both are evidence-based choices depending on the child's functional goals.

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131. The 'Fugl-Meyer Sensory Assessment' (FMA-S) tests which sensory modalities post-stroke?

A. Pain and temperature

B. LIGHT TOUCH and JOINT POSITION SENSE — each tested at 4 locations bilaterally (shoulder, palm, thigh, sole) — maximum 24 points (0 = no sensation, 2 = normal sensation per area per modality)

C. Two-point discrimination only

D. Stereognosis only

✓ Answer: B

💡 **Rationale & Explanation:**

FMA Sensory Assessment (FMA-S, part of the full FMA): tests two primary sensory modalities: LIGHT TOUCH (exteroception) using cotton wool at: shoulder, palm of hand, thigh, sole of foot — scored 0 (no sensation), 1 (impaired), 2 (normal) per site × 4 sites × 2 sides = 16 points max. JOINT POSITION SENSE (proprioception/kinesthesia): shoulder, wrist, hip, ankle — scored 0 (no proprioception), 1 (≥75% wrong responses), 2 (<25% wrong responses) = 8 points max. TOTAL FMA-S = 24 points. POST-STROKE SENSORY IMPAIRMENT affects: up to 65% of stroke patients; rehabilitation progress (sensory feedback essential for motor re-learning); safety awareness; functional outcomes. The FMA-S is part of the comprehensive FMA but is

sometimes administered as a standalone sensory assessment in stroke evaluation.

NEUROLOGICAL ASSESSMENT

132. The 'Aphasic Quotient' on the Western Aphasia Battery (WAB) is calculated from:

A. Hospital records

B. FOUR SUBTESTS: Spontaneous Speech (20 points), Auditory Verbal Comprehension (10 points), Repetition (10 points), Naming (10 points) — totaling 50 raw points, multiplied by 2 = Aphasia Quotient (AQ) maximum 100

C. Two tests only

D. Functional communication only

✓ Answer: B

💡 **Rationale & Explanation:**

Western Aphasia Battery (WAB, Kertesz): the most widely used standardized aphasia assessment. THE APHASIA QUOTIENT (AQ) = the primary severity score. Components: 1) SPONTANEOUS SPEECH (0-20): information content (10 pts) + fluency, grammatical competence, paraphasia (10 pts); 2) AUDITORY VERBAL COMPREHENSION (0-200 raw): yes/no questions (60 pts) + auditory word recognition (60 pts) + sequential commands (80 pts) — converted to 0-10; 3) REPETITION (0-100 raw) → converted to 0-10; 4) NAMING (0-100 raw) → converted to 0-10. Sum of 4 subtests = 0-50 → × 2 = AQ (0-100). AQ INTERPRETATION: 0-25 = very severe; 25-50 = severe; 50-75 = moderate; 75-93.8 = mild; >93.8 = normal. The WAB also classifies the APHASIA TYPE (Broca's, Wernicke's, Conduction, Global, Anomic, etc.) based on the pattern of subtest scores.

NEUROLOGICAL REHABILITATION

133. **'CIMT' for post-stroke patients: a meta-analysis by Kwakkel et al. (2015) found that the MINIMUM EFFECTIVE DOSE is approximately:**

A. 5 hours total

B. At least 15-20 HOURS of intensive UE practice during the constraint period — with 6 hours/day × 2 weeks being the standard protocol from Wolf et al.'s EXCITE trial

C. 1-2 hours total

D. 100+ hours

✓ Answer: B

💡 **Rationale & Explanation:**

CIMT dosage evidence: the EXCITE trial (Wolf et al., 2006): 6 hours/day of intensive task practice + 90% daytime constraint for 10 consecutive weekdays = 60 hours total. This protocol showed significant improvements maintained at 1 and 2 years follow-up. MODIFIED CIMT (mCIMT): 3 hours/day of practice + 5 hours/day constraint for 2 weeks — comparable outcomes to full CIMT for some patient subgroups. META-ANALYTIC FINDINGS: the dose of INTENSIVE PRACTICE matters more than the constraint itself — patients with more hours of task practice show greater UE gains. Minimum effective dose: approximately 15-20 hours of intensive task practice total. Below this threshold: limited benefit. Above 60 hours: diminishing returns. PRACTICAL IMPLICATION: schedule adequate time for intensive practice; even brief sessions of daily CIMT-style task practice add up and benefit patients who cannot tolerate 6-hour full protocol.

NEUROLOGICAL ASSESSMENT

134. **Post-stroke, the most reliable CLINICAL TEST to differentiate SENSORY ATAXIA from CEREBELLAR ATAXIA without imaging is:**

A. CT scan

B. The ROMBERG TEST — sensory ataxia: patient can balance with eyes open (visual compensation) but FALLS with eyes closed (Romberg positive — loses without vision when proprioception is impaired). Cerebellar ataxia: patient sways or falls EVEN WITH EYES OPEN (vision cannot compensate for cerebellar dysfunction)

C. Finger-nose test only

D. Gait speed test

✓ Answer: B

💡 **Rationale & Explanation:**

Sensory vs. cerebellar ataxia clinical differentiation: SENSORY ATAXIA (dorsal column or peripheral neuropathy): proprioception is impaired; vision COMPENSATES — patient walks adequately with eyes OPEN (using vision for spatial feedback); walking deteriorates dramatically with eyes CLOSED or on uneven ground. ROMBERG TEST: POSITIVE (falls or sways significantly with eyes closed). CEREBELLAR ATAXIA: the cerebellum processes all sensory inputs; vision does NOT fully compensate. Patient sways or has wide-based gait EVEN WITH EYES OPEN. ROMBERG: may be positive but the WIDE-BASED GAIT and INTENTION TREMOR are present regardless of visual input. Additional distinguishing features: cerebellar = dysmetria on finger-nose and heel-shin; sensory ataxia = absent or reduced proprioception on testing; cerebellar = nystagmus; sensory ataxia = no nystagmus typically.

NEUROLOGICAL REHABILITATION

135. In pediatric CP, the 'GMFM-88' item 'standing on right foot for 3 seconds' is scored as:

A. Always 0 for hemiplegic CP

B. 2 (PARTIAL): the child attempts the task and completes it at least once but does not consistently hold for 3 seconds; OR 3 (COMPLETE): holds 3 seconds consistently; OR 1 (INITIATES): attempts but cannot complete

C. Pass/fail only

D. Not tested under age 5

✓ **Answer: B**

💡 **Rationale & Explanation:**

GMFM scoring: each of the 88 items (66 in GMFM-66) is scored on a 4-point scale: 0 = Does not initiate (does not even start attempting the task); 1 = Initiates (begins the task but completes <10% of it); 2 = Partially completes (completes ≥10% but <100% of the task criteria); 3 = Completes (completes the full task as described). Example — standing on one foot for 3 seconds: Score 0 = makes no attempt to lift foot; Score 1 = lifts foot for <0.3 second only; Score 2 = holds for 1-2 seconds (≥10% but not full 3 seconds); Score 3 = holds for 3 full seconds. This precise scoring system allows SENSITIVE DETECTION of small improvements — a child progressing from score 1 to score 2 shows meaningful progress even though they still cannot complete the task. MCID for GMFM-66: approximately 1.58 points (on the 100-point scale).

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136. The 'ABCA' (Active Balance-Based Cerebral Palsy Exercise) approach for improving balance in CP emphasizes:

A. Passive stretching

B. TASK-SPECIFIC BALANCE PRACTICE in progressively challenging environments — standing on unstable surfaces, dual-task walking, perturbation training — driven by MOTOR LEARNING PRINCIPLES rather than passive facilitation

C. Hydrotherapy only

D. Strengthening only

✓ **Answer: B**

💡 **Rationale & Explanation:**

Evidence-based balance training in CP: modern CP balance rehabilitation has moved from passive neurodevelopmental techniques toward ACTIVE, TASK-SPECIFIC, MOTOR-LEARNING-BASED approaches: 1) CHALLENGE the balance system progressively (stable →

unstable surfaces); 2) DUAL-TASK training (cognitive + motor simultaneously); 3) PERTURBATION training (reactive balance responses); 4) VIRTUAL REALITY balance games (motivating, provides augmented feedback, quantifies performance); 5) AQUATIC BALANCE training (reduces fall fear, allows practice in safe environment). Evidence: progressive balance training programs improve static balance, dynamic balance, gait, and fall rates in CP children. The GMFCS level guides intensity and task selection: GMFCS I-II = competitive sport-level balance challenges; GMFCS III = stepping and reaching tasks with support; GMFCS IV = supported standing balance tasks.

NEUROLOGICAL ASSESSMENT

137. The 'FONE FIM' (phone-based FIM) is used because:

A. Hospital FIM is inaccurate

B. FOLLOW-UP DATA can be collected by PHONE after discharge — a therapist calls the patient/caregiver and asks standard FIM questions about 18 functional items, allowing tracking of community function outcomes without requiring an in-person visit

C. It is cheaper than in-person assessment

D. It replaces in-person FIM in the hospital

✓ Answer: B

💡 **Rationale & Explanation:**

Phone-administered FIM (FONE FIM, Ottenbacher et al.): a validated method for collecting FIM data by TELEPHONE INTERVIEW after discharge. Used in: 1) OUTCOME TRACKING — following patients after discharge to see if FIM gains are maintained at 3, 6, and 12 months post-rehabilitation; 2) RESEARCH — large-scale outcome studies cannot always conduct in-person follow-ups; 3) CLINICAL QUALITY IMPROVEMENT — monitoring community function after discharge. Validity: excellent correlation with in-person FIM for most items; slightly weaker for motor tasks requiring observation (cognitive items

particularly well-validated by phone). The FONE FIM is a pragmatic tool for tracking 'real-world' outcomes after stroke and TBI rehabilitation — an important component of evidence-based outcome monitoring systems.

NEUROLOGICAL REHABILITATION

138. 'Constraint-induced aphasia therapy' (CIAT) — the linguistic equivalent of CIMT for aphasia — works by:

A. Teaching sign language as compensation

B. CONSTRAINING verbal communication COMPENSATIONS (gestures, drawing, pointing) and FORCING the patient to USE VERBAL LANGUAGE INTENSIVELY in structured card games and functional tasks — 3 hours/day × 10 days

C. Complete communication rest

D. Passive auditory exposure

✓ Answer: B

💡 **Rationale & Explanation:**

CIAT (Constraint-Induced Aphasia Therapy / Intensive Language-Action Therapy, ILAT): based on CIMT principles applied to language rehabilitation. The patient plays structured card games requiring VERBAL COMMUNICATION to request cards from other players. VERBAL REQUESTS ONLY — no gestures, no writing, no pointing (these 'learned non-use' behaviors are constrained). The forced use of verbal language, combined with the natural social motivation of the game and intensive repetition (hundreds of verbal attempts per session), drives LANGUAGE REORGANIZATION in the affected left hemisphere. Evidence: high-quality RCTs show CIAT improves: communication ability, naming, word finding, spontaneous speech. Effective in BOTH acute and chronic aphasia. Dose: 3 hours/day × 10 days (30 hours total). The social game format maintains motivation better than drill-based practice.

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139. 'Body weight-supported treadmill training' (BWSTT) for an incomplete SCI patient at the T10 level should start with approximately what body weight support?

A. 0% (full body weight)

B. 30-40% body weight support initially — enough support to allow stepping pattern without excessive collapse, while maintaining sufficient loading to activate CPG and generate therapeutic weight-bearing stimulus — gradually reducing support as strength improves

C. 80-90% body weight support always

D. 50-60% always, never changed

✓ Answer: B

💡 **Rationale & Explanation:**

BWSTT BWS percentage for incomplete SCI: the goal is to find the MINIMUM SUPPORT that allows a near-normal step pattern — too much support = insufficient loading for CPG activation; too little = patient collapses, compensatory patterns dominate. START at 30-40% BWS for most T10 incomplete SCI patients — this allows the patient to bear 60-70% of body weight, which is sufficient for CPG activation and bone/muscle loading. PROGRESSION: reduce BWS by 5-10% each session as the patient's strength and endurance improve. TREADMILL SPEED: start slow (0.3-0.6 m/s), increase as stepping quality improves (target 0.5+ m/s for CPG activation). MANUAL FACILITATION: therapists facilitate hip extension, knee control, and foot placement during each step. OUTCOME GOAL: reduce to 0% BWS (full overground walking) for ASIA C-D patients with adequate strength. This protocol is the evidence-based standard for SCI locomotor training.

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140. The 'Hemispheric' differences in post-stroke rehabilitation outcomes: patients with RIGHT hemisphere strokes often have WORSE REHABILITATION OUTCOMES than those with LEFT hemisphere strokes because:

A. Right hemisphere strokes are always larger

B. DENIAL OF DISABILITY (anosognosia), LEFT SPATIAL NEGLECT, IMPULSIVITY, and POOR INSIGHT into deficits impair rehabilitation

participation — the patient doesn't recognize their own deficits and doesn't engage with therapy as effectively

C. Left hemisphere is less important

D. Right hemisphere strokes cause more weakness

✓ Answer: B

💡 **Rationale & Explanation:**

Right hemisphere stroke rehabilitation challenges: 1) ANOSOGNOSIA (denial of illness/disability — up to 30%): patient insists they have no deficit; refuses therapy; cannot understand why they need rehabilitation; 2) LEFT SPATIAL NEGLECT (up to 67% of right hemisphere strokes): functional ADL problems from not processing left-side information; falls; unable to find food on the left side of plate; 3) IMPULSIVITY: attempts unsafe activities without recognizing the risk; high fall rate; 4) POOR INSIGHT: cannot form meaningful goals because they don't recognize their own limitations; 5) VISUOSPATIAL DEFICITS: difficulty with depth perception, spatial relationships, orientation; 6) BEHAVIORAL CHANGES: disinhibition, flat affect, or inappropriate behavior. These 'invisible' deficits often affect prognosis more than the motor deficits. PT strategies: use visual cues (approach from the right, gradually shift to left); structured environments; consistent routines; caregiver education.

NEUROLOGICAL ASSESSMENT

141. The 'UPDRS' (Unified Parkinson's Disease Rating Scale) Part III (motor examination) includes how many items?

A. 5 items

B. 18 ITEMS — rated 0-4 each: tremor, rigidity, bradykinesia, gait, postural stability, arising from chair, facial expression, speech, posture, finger taps, hand movements, rapid alternating movements, leg agility, gait, freezing of gait, postural stability, posture, body bradykinesia

C. 3 items

D. 30 items

✓ **Answer: B**

💡 **Rationale & Explanation:**

UPDRS Part III (Motor Examination): 18 motor items, each scored 0-4 (0 = normal, 4 = severe). Items include: 3.1 Speech; 3.2 Facial expression; 3.3 Rigidity (neck + 4 limbs = 5 ratings); 3.4 Finger tapping (bilateral = 2 ratings); 3.5 Hand movements (bilateral = 2); 3.6 Pronation-supination (bilateral = 2); 3.7 Toe tapping (bilateral = 2); 3.8 Leg agility (bilateral = 2); 3.9 Arising from chair; 3.10 Gait; 3.11 Freezing of gait; 3.12 Postural stability (pull test); 3.13 Posture; 3.14 Global spontaneity of movement; 3.15 Postural tremor (bilateral = 2); 3.16 Kinetic tremor (bilateral = 2); 3.17 Rest tremor (bilateral = 2); 3.18 Consistency of rest tremor. Maximum Part III score = 132 (though practically 0-60 is the functional range). Updated: the MDS-UPDRS (2008) is the current standard.

NEUROLOGICAL REHABILITATION

142. In ABI (acquired brain injury) rehabilitation, the 'RLA' (Rancho Los Amigos) Levels IV-V cognitive behavior pattern requires PT to:

A. Use complex cognitive tasks

B. PROVIDE A LOW-STIMULATION ENVIRONMENT, use SIMPLE CONSISTENT COMMANDS, allow adequate response time, avoid situations that trigger agitation, use redirection rather than confrontation — the patient is confused and agitated and cannot process complex information

C. Discharge immediately

D. Increase environmental stimulation

✓ **Answer: B**

💡 **Rationale & Explanation:**

Rancho Level IV (Confused-Agitated) and Level V (Confused-Inappropriate) PT approach: LEVEL IV: patient is in PTA, highly agitated,

unable to cooperate with therapy, may be aggressive, attention span of seconds. PT: safety first (protective equipment if necessary, safe environment); brief, purposeful handling sessions (5-10 minutes only); avoid activities that increase agitation; consistent team approach; caregiver education. LEVEL V: less agitated but still confused, inappropriate responses, short attention span (minutes), easily distracted, responds to familiar persons/tasks. PT: structured environment; familiar tasks; simple one-step commands; maximum 15-30 minute sessions; consistent therapist; memory aids (whiteboards with daily schedule, orientation materials); caregiver training. The PT must recognize that learning-based rehabilitation is NOT effective during PTA — focus on preventing complications and maintaining physical condition.

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143. 'Functional electrical stimulation' (FES) for SCI: 'FES-rowing' combines upper extremity FES with:

A. Passive leg movement

B. ACTIVE UPPER EXTREMITY ROWING while FES stimulates the lower extremity muscles — significantly increasing VO2 and cardiovascular training intensity beyond arm ergometry alone

C. Aquatic therapy

D. Passive stretching

✓ Answer: B

💡 Rationale & Explanation:

FES-rowing in SCI: a hybrid exercise modality combining: VOLUNTARY upper extremity rowing (arm pull); ELECTRICALLY STIMULATED lower extremity muscles (quadriceps, hamstrings, gluteals) activated in synchrony with the rowing motion. Cardiovascular effect: the LARGE muscle mass activated (arms + legs together) dramatically increases VO2 compared to arm ergometry alone — may achieve 70-80% VO2max versus 50-60% with arms alone. Benefits: superior cardiovascular training intensity; activates more muscle mass for metabolic benefits; reduces cardiovascular mortality risk; combines upper and lower extremity training in one session. FES-rowing

ergometers (RowStim, RT300 rowing machines with FES): purpose-built for SCI FES exercise. Also available: FES cycling (lower extremity only), FES-assisted hand cycling. These technologies are increasingly available in Philippine rehabilitation centers.

NEUROLOGICAL ASSESSMENT

144. The 'EDSS Step 6' in multiple sclerosis means:

A. Patient can walk independently without any aid

B. PATIENT REQUIRES A WALKING AID (cane, crutch, brace) to walk about 100 meters with or without resting

C. Patient is wheelchair dependent

D. Patient is bed-bound

✓ Answer: B

💡 Rationale & Explanation:

EDSS Step 6 (Kurtzke): requires UNILATERAL OR BILATERAL ASSISTANCE (cane, crutch, or brace) to walk about 100 meters with or without resting. Steps around 6: 5.0 = walks without aid about 200 m; 5.5 = walks without aid about 100 m; 6.0 = INTERMITTENT or UNILATERAL constant assistance (cane, crutch, brace) required to walk 100 m; 6.5 = CONSTANT BILATERAL assistance required to walk 20 m. The transition to step 6 is clinically significant — it marks the patient requiring a walking aid for the first time, a major functional milestone. PT at step 6: optimize walking aid selection and fit; fall prevention; assistive device training; energy conservation for walking; exercises to maintain lower extremity strength; consideration of power mobility for community distances.

NEUROLOGICAL REHABILITATION

145. The 'spastic paraplegia' in SCI above the conus differs from 'flaccid paralysis' in SCI at or below the conus (conus/cauda equina lesions) in that:

A. Both result in identical presentations

B. ABOVE CONUS (UMN pattern): spasticity, hyperreflexia, bladder is REFLEX (automatic) type — can be triggered to void on schedule; BELOW CONUS / CAUDA EQUINA (LMN pattern): flaccid paralysis, areflexia, bladder is AREFLEXIC (autonomous) type — must be manually expressed or use Credé maneuver

C. Both result in flaccid paralysis

D. Conus injuries always spare the bladder

✓ Answer: B

💡 **Rationale & Explanation:**

Conus vs. cauda equina injury comparison: ABOVE CONUS (T12 and above, upper cord): UMN pattern below the injury (after spinal shock resolves): spasticity, hyperreflexia, Babinski positive; BLADDER: reflex (UMN) bladder — the sacral reflex arc is intact; bladder empties reflexively when full (timed voiding or triggered voiding techniques); BOWEL: reflex bowel — controlled by sacral reflex (digital stimulation triggers reflexive evacuation). CONUS/CAUDA EQUINA (L1-S5 level): LMN pattern — flaccid paralysis, areflexia; BLADDER: areflexic (autonomous, LMN) — detrusor does not contract; must use Credé (manual suprapubic pressure), Valsalva, or clean intermittent catheterization (CIC); BOWEL: areflexic bowel — no reflex evacuation; use manual removal or stoma. PT/nursing must know the bladder/bowel management differences to appropriately plan and educate patients.

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146. Post-stroke 'shoulder subluxation' management in the flaccid phase includes all EXCEPT:

A. Supported positioning of the arm

B. Functional electrical stimulation (FES) to supraspinatus and posterior deltoid

C. Aggressive passive glenohumeral joint traction

D. Kinesiology tape application for joint support

✓ **Answer: C**

💡 **Rationale & Explanation:**

Flaccid shoulder management: shoulder subluxation occurs in up to 81% of stroke patients with flaccid upper extremity — the rotator cuff cannot maintain glenohumeral joint integrity without neural support. EVIDENCE-BASED MANAGEMENT: 1) SUPPORTED POSITIONING: arm trough on wheelchair, elevated positioning when in bed, arm sling during ambulation (controversial — may increase neglect); 2) FES: to supraspinatus and posterior deltoid — strongest evidence (Level 1) for reducing subluxation and pain; 3) KINESIOLOGY TAPE: glenohumeral support tape; 4) SUPPORTIVE DEVICES: hemiplegic arm slings, AAOS devices. WHAT TO AVOID: AGGRESSIVE PASSIVE TRACTION on the flaccid shoulder — the capsule and ligaments are lax and cannot withstand traction loading without injury; risk of causing impingement, bursitis, CRPS, and worsening subluxation. Handle the flaccid shoulder gently — never pull on the arm.

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147. 'Constraint-induced language therapy' (CILT) is most effective for which type of aphasia?

A. Global aphasia with no verbal output

B. MILD TO MODERATE NON-FLUENT (BROCA'S) APHASIA with some residual verbal ability — the patient must have SOME verbal output to constrain toward (if there's no verbal output, there's nothing to constrain); high intensity is tolerated best by those with enough function to engage

C. Wernicke's aphasia with fluent jargon

D. Anomia only

✓ **Answer: B**

💡 **Rationale & Explanation:**

CILT patient selection: requires SOME RESIDUAL VERBAL ABILITY — at minimum, single-word production. Why: CILT constrains gestures and compensatory strategies to FORCE verbal output; if the patient has no verbal ability at all (global aphasia), there's nothing to 'release'

through constraint. Optimal candidates: MILD-MODERATE BROCA'S APHASIA with single-word or short phrase verbal ability. CHRONIC aphasia (>6 months post-stroke): CILT works in chronic aphasia — neuroplasticity is possible even years after stroke with sufficient intensity and motivation. HIGH MOTIVATION is essential — 3 hours/day of intensive language tasks is demanding. Exclusions: severe cognitive impairment (cannot follow rules of the card game), severe fatigue (MS, TBI with poor endurance). CILT has been used with: stroke, TBI, progressive aphasia — always individually tailored.

NEUROLOGICAL ASSESSMENT

148. The 'NIHSS Item 7 (Limb Ataxia)' is specifically testing for:

A. Spasticity

B. CEREBELLAR DYSFUNCTION — tested with FINGER-NOSE-FINGER and HEEL-SHIN tests; scored 0 (absent), 1 (present in one limb), 2 (present in two limbs); this item is scored as ABSENT if the patient cannot understand or is too weak to perform (ataxia must be out of proportion to weakness)

C. Proprioception loss

D. Hemiplegia severity

✓ Answer: B

💡 **Rationale & Explanation:**

NIHSS Item 7 Limb Ataxia: FINGER-NOSE-FINGER (FNF) test: examiner's finger is held in the patient's visual field; patient touches their own nose, then the examiner's finger, repeatedly. POSITIVE (ataxia present): the patient misses the target (dysmetria), especially as they approach the target (intention tremor pattern). HEEL-SHIN test: patient raises one heel, places it on the other knee, and slides it down the shin smoothly. POSITIVE: patient's heel jerks, deviates, or cannot slide smoothly. CEREBELLAR ATAXIA indicates CEREBELLAR STROKE (posterior circulation). IMPORTANT: limb ataxia that is present in a patient with COMPLETE HEMIPLEGIA should be scored 0 (absent) —

you cannot assess cerebellar function when limbs are too weak to move. The inability to distinguish weakness from cerebellar incoordination is a key NIHSS scoring principle.

NEUROLOGICAL REHABILITATION

149. 'Spinal cord stimulation' (SCS) as an emerging intervention for complete SCI aims to:

A. Regenerate axons

B. ELECTRICALLY STIMULATE THE DORSAL SPINAL CORD below the injury level to modulate the CPG and motor circuits — enabling voluntary leg movement in some individuals who were classified as 'complete' SCI (AIS A) when combined with intensive rehabilitation

C. Replace FES

D. Treat neuropathic pain only

✓ Answer: B

💡 **Rationale & Explanation:**

Epidural spinal cord stimulation (eSCS) for complete SCI: groundbreaking research (Harkema, Angeli, Grahn, Gill et al.): epidural electrodes implanted below the injury level; continuous electrical stimulation of the dorsal spinal cord; when stimulation is ON + the patient is in a harness on a treadmill making voluntary effort → some patients previously classified as AIS A (complete) can generate VOLUNTARY STEPPING MOVEMENTS. Mechanism: the stimulation modulates the CPG and the residual sub-threshold descending connections (which may not be absent even in 'complete' injuries as classified by ASIA exam). The results suggest the ASIA motor exam may overestimate completeness — some apparently complete injuries may have latent preserved connections that eSCS unmasks. This is one of the most exciting areas of SCI neuroscience research (2014-2024). Currently experimental — not standard clinical practice.

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150. The 'wrist-hand splint' in the POSITION OF FUNCTION for a hemiplegic patient is positioned with:

A. Wrist flexion 30°, fingers full flexion

B. WRIST EXTENSION 20-30°, MCP joints 60-70° flexion, IP joints slight flexion (10-20°), thumb in abduction/opposition — this allows easy release and grasp function

C. Fingers fully extended

D. Wrist neutral, fingers in fist

✓ Answer: B

💡 **Rationale & Explanation:**

Position of function for wrist-hand splint: This is the INTRINSIC-PLUS position that allows: TENODESIS GRASP: wrist extension naturally tightens the extrinsic finger flexors → passive finger flexion for grasp; FUNCTIONAL GRIP: when the wrist extends, the fingers naturally flex to hold objects; PREVENTION OF DEFORMITY: prevents the wrist flexion + finger flexion contracture pattern that develops in flaccid/spastic hemiplegia. Compare: REST SPLINT (for anti-spasticity, worn at night): wrist 0-10°, MCP 45°, IP slightly flexed. DYNAMIC SPLINTS: for allowing controlled movement during tasks. ANTI-SPASTICITY SPLINT: keeps the spastic muscles at their maximum passive length. In post-stroke PT: the correct splint type and position must be chosen based on: flaccid vs. spastic tone; functional goals; sleep vs. daytime use; patient tolerance.

├— STROKE REHABILITATION

100. Which of the following IS a contraindication to tPA (alteplase) thrombolysis in acute ischemic stroke?

A. Onset within 4.5 hours

B. Recent major surgery within 14 days, active bleeding, hemorrhagic stroke (on CT scan), or BP >185/110 that cannot be controlled

C. Mild neurological deficits

D. NIHSS score <4

✓ **Answer: B**

💡 **Rationale & Explanation:**

tPA contraindications (PT must recognize red flags for acute stroke): tPA (tissue plasminogen activator) is the only FDA-approved thrombolytic for acute ischemic stroke (within 3-4.5 hours of onset). ABSOLUTE CONTRAINDICATIONS: hemorrhage on CT; recent major surgery (<14 days); active internal bleeding; prior intracranial surgery/trauma (<3 months); prior stroke within 3 months; very high BP (>185/110) not controllable; platelet count <100,000; anticoagulant use with high INR. PT RELEVANCE: recognizing the acute stroke presentation and understanding the treatment window is critical for PT professionals. A patient presenting with sudden hemiplegia, facial droop, aphasia = CALL EMERGENCY SERVICES immediately. The faster the treatment, the better ('time is brain'). PT should know the FAST mnemonic: Face drooping, Arm weakness, Speech difficulty, Time to call emergency.

NEUROLOGICAL REHABILITATION

101. The 'NIHSS' (National Institutes of Health Stroke Scale) assesses:

A. Only motor function after stroke

B. STROKE SEVERITY across 11 domains: consciousness, gaze, visual fields, facial palsy, arm/leg motor, limb ataxia, sensory, language, dysarthria, extinction/neglect — scored 0-42 (0 = no deficit, higher = more severe stroke)

C. Physical therapy function

D. Balance only

✓ **Answer: B**

💡 **Rationale & Explanation:**

NIHSS: the most widely used clinical stroke severity scale. 11 items, scored 0-42. CLASSIFICATION: 0 = no stroke; 1-4 = minor stroke; 5-15 =

moderate; 15-20 = moderate-severe; >20 = severe stroke. Items: Level of consciousness (3 items); Gaze; Visual fields; Facial palsy; Arm motor (2 items — right and left); Leg motor (2 items); Limb ataxia; Sensory; Language (aphasia); Dysarthria; Extinction and neglect. PT relevance: the NIHSS score at admission predicts: rehabilitation potential, likely deficits requiring PT attention, length of stay, and functional outcome. A patient with NIHSS 15+ will likely need intensive multidisciplinary rehabilitation. The NIHSS guides PT treatment intensity and goals in the acute phase.

NEUROLOGICAL ASSESSMENT

102. The 'MOCA' (Montreal Cognitive Assessment) screens for mild cognitive impairment (MCI) with:

A. 10 items, normal ≥8/10

B. 30-item assessment: visuospatial/executive, naming, memory, attention, language, abstraction, delayed recall, orientation — score ≥26/30 = normal; 18-25 = mild cognitive impairment; <17 = moderate impairment

C. 5 items only

D. Blood tests

✓ Answer: B

💡 **Rationale & Explanation:**

MoCA (Montreal Cognitive Assessment, Nasreddine 2005): more sensitive than MMSE for detecting MILD COGNITIVE IMPAIRMENT (MCI). 30 total points. Domains: VISUOSPATIAL/EXECUTIVE (trail-making, cube copy, clock drawing = 5 pts); NAMING (3 animals = 3 pts); MEMORY (5 words repeated, not scored until delayed recall = 5 pts); ATTENTION (digit span, serial 7s, vigilance = 6 pts); LANGUAGE (sentence repetition, verbal fluency = 3 pts); ABSTRACTION (similarities = 2 pts); DELAYED RECALL (5 words from earlier = 5 pts); ORIENTATION (date, month, year, day, place, city = 6 pts). Add 1 point if ≤12 years education. Normal: ≥26/30. MoCA detects early dementia and MCI

better than MMSE because it includes executive function and visuospatial tests. Essential for post-stroke and TBI cognitive screening in PT.

NEUROLOGICAL REHABILITATION

103. The 'Fugl-Meyer Assessment Upper Extremity' (FMA-UE) maximum score is:

A. 100 points

B. 66 POINTS — testing 33 items each scored 0-2 (0 = cannot perform, 1 = partial, 2 = complete) covering reflexes, flexor synergy, extensor synergy, combined synergy movements, wrist and hand function, and coordination

C. 50 points

D. 26 points

✓ Answer: B

💡 Rationale & Explanation:

FMA-UE details: 66 POINTS MAXIMUM for upper extremity (33 items × 2 points each). Structure: SHOULDER/ELBOW/FOREARM: A. Reflexes (2 pts); B. Flexor synergy (12 pts); C. Extensor synergy (6 pts); D. Combined movements (6 pts); E. Wrist (10 pts); F. Hand (14 pts); G. Coordination/speed (6 pts). Total UE = 66. FMA-LE maximum = 34 pts. FMA TOTAL = 226 pts (including balance, sensory, ROM/pain). MCID for FMA-UE: ~4-7 points (depends on baseline severity). The FMA-UE is the criterion standard for measuring post-stroke motor impairment in research and many clinical settings. It follows the Brunnstrom stages — reflexes and synergistic movements are tested first, progressing to selective independent movements and coordination.

SPINAL CORD INJURY

104. **In SCI, 'syringomyelia' (syrinx) is a late complication characterized by:**

A. Infection of the cord

B. A FLUID-FILLED CAVITY within the SPINAL CORD that slowly EXPANDS, causing progressive neurological deterioration ABOVE the previous injury level — ascending loss of pain/temperature sensation, new weakness, pain

C. Increased spasticity only

D. Autonomic dysreflexia

✓ Answer: B

💡 **Rationale & Explanation:**

Post-traumatic syringomyelia: a syrinx (fluid-filled cyst) forms within the spinal cord, typically at or above the injury level. It slowly expands, compressing and destroying adjacent cord tissue. Onset: months to years after SCI. RED FLAGS: new ASCENDING neurological deficits (sensory loss traveling upward), new pain (especially cape-like pain in upper extremities in thoracic injury patients), increased spasticity, sweating changes above the injury level, or previously stable patient developing new deficits. Diagnosis: MRI shows the cystic cavity within the cord. Treatment: surgical drainage/shunting if symptomatic. PT RELEVANCE: any new or progressive neurological deterioration in a known SCI patient should be evaluated for syringomyelia with urgent medical referral before continuing rehabilitation.

NEUROLOGICAL ASSESSMENT

105. **The 'dynamic gait index' (DGI) assesses:**

A. Static balance only

B. Walking ability under CHANGING CONDITIONS — 8 gait tasks including changing speed, horizontal and vertical head movements, stepping over/around obstacles, stairs, and pivot turns — scored 0-3 each, max 24 — ≤19 = fall risk

C. Upper extremity function

D. Cognitive function

✓ **Answer: B**

💡 **Rationale & Explanation:**

Dynamic Gait Index (Shumway-Cook & Woollacott): 8 gait tasks: 1) Gait on level surface; 2) Change in gait SPEED (faster/slower on command); 3) HORIZONTAL head turns while walking; 4) VERTICAL head turns while walking (up/down); 5) Pivot and STOP; 6) Step OVER obstacle; 7) Step AROUND obstacles; 8) STAIRS. Each scored 0-3 (0 = severe impairment, 3 = normal). Total 0-24. FALL RISK: ≤19/24. The DGI challenges DUAL-TASK and ADAPTIVE balance — relevant to real-world walking demands. Particularly useful for: vestibular rehabilitation, stroke, TBI, PD, MS, fall prevention programs. The 4-item DGI (DGI-4) is a quick screen. The Functional Gait Assessment (FGA) is an updated version with better ceiling effects.

├— NEUROLOGICAL REHABILITATION

106. 'Stroke unit' care (dedicated inpatient stroke rehabilitation unit with coordinated multidisciplinary team) compared to general ward care:

A. Has no proven benefit

B. Has the STRONGEST EVIDENCE in stroke rehabilitation — reduces death, dependency, and institutional care by ~18% each, with absolute risk reduction of ~5% compared to general ward care — the single most effective stroke intervention

C. Is only available in developed countries

D. Is only for minor strokes

✓ **Answer: B**

💡 **Rationale & Explanation:**

Stroke unit evidence: the Cochrane Systematic Review of Stroke Unit Trialists (multiple updates) provides the strongest evidence base in stroke care. Stroke units vs. general wards: ABSOLUTE RISK

REDUCTION: death reduced by ~5%; death or institutionalization reduced by ~18%; death or dependency reduced by ~18%. This benefit applies to ALL stroke subtypes and severities. What makes stroke units work: 24-hour specialist nursing; early and intensive PT, OT, SLP; coordinated multidisciplinary team meetings; standardized protocols; early mobilization; complication prevention. The stroke unit effect is LARGER than any single drug therapy or individual intervention for stroke. PT students must understand why the SYSTEM of care matters, not just individual therapy techniques.

NEUROLOGICAL ASSESSMENT

107. The 'ASIA motor score' is calculated by summing the MMT grades of 10 key muscles per side. What is the MAXIMUM upper extremity motor score?

A. 20

B. 25 — 5 muscles each side (C5-T1), each graded 0-5 = maximum 5×5 = 25 points per side = 50 total UE

C. 50

D. 10

✓ Answer: C

💡 Rationale & Explanation:

ASIA Motor Score breakdown: UPPER EXTREMITY (per side): C5 = elbow flexors (0-5); C6 = wrist extensors (0-5); C7 = elbow extensors (0-5); C8 = finger flexors (0-5); T1 = finger abductors (0-5). Maximum per side = 25. Total UE = 50. LOWER EXTREMITY (per side): L2 = hip flexors; L3 = knee extensors; L4 = ankle dorsiflexors; L5 = long toe extensors; S1 = ankle plantarflexors. Maximum per side = 25. Total LE = 50. TOTAL MOTOR SCORE maximum = 100 (50 UE + 50 LE). A motor score of 100 = all key muscles normal bilaterally. This quantification is essential for classifying SCI severity and tracking recovery over time. Important: the ASIA motor score only evaluates 10 key muscles per side — it does

NOT capture ALL motor deficits, particularly trunk and proximal muscles not included in the key muscle set.

NEUROLOGICAL REHABILITATION

108. 'Virtual reality' (VR) rehabilitation for post-stroke upper extremity uses which primary mechanism?

A. Pain distraction

B. INTENSIVE, TASK-SPECIFIC, REPETITIVE practice in an ENGAGING VIRTUAL ENVIRONMENT — motivating patients to perform hundreds more repetitions per session than traditional therapy, driving the neuroplasticity needed for motor recovery

C. Balance only

D. Passive ROM

✓ Answer: B

💡 **Rationale & Explanation:**

VR rehabilitation mechanisms in stroke: 1) REPETITION: VR games encourage hundreds of UE repetitions per session — far exceeding what traditional tabletop therapy achieves; 2) TASK-SPECIFICITY: VR tasks (reaching, grasping, throwing virtual objects) mimic real functional activities; 3) FEEDBACK: real-time visual feedback about movement quality; 4) ENGAGEMENT/MOTIVATION: game elements (scores, levels) maintain motivation and attention; 5) VARIABLE PRACTICE: easy to vary task demands (contextual interference); 6) SAFE: can practice tasks (like reaching high shelves or crossing roads) that would be unsafe in reality. Evidence: commercial VR systems (Nintendo Wii, Xbox Kinect) and purpose-built rehabilitation VR systems show moderate evidence for improving UE function and balance post-stroke. Most effective when combined with conventional PT. Not a replacement for therapist-guided practice.

SPINAL CORD INJURY

109. The 'ASIA Impairment Scale' distinguishes between 'COMPLETE' and 'INCOMPLETE' injury primarily by:

A. The presence or absence of voluntary movement

B. Whether SENSORY AND MOTOR FUNCTION is preserved in the SACRAL SEGMENTS S4-S5 — preserved sacral sensation (perianal sensation) and/or voluntary anal sphincter contraction = INCOMPLETE injury (AIS B, C, D)

C. The level of injury

D. Whether the patient can walk

✓ Answer: B

💡 **Rationale & Explanation:**

AIS complete vs. incomplete sacral criterion: the KEY distinguishing feature between AIS A (complete) and AIS B/C/D (incomplete) is preservation of SACRAL SEGMENT FUNCTION (S4-S5): SACRAL SPARING criteria: (1) Perianal SENSATION (light touch or pin prick at S4-S5 dermatome — tested at the anal mucocutaneous junction); OR (2) Voluntary ANAL SPHINCTER CONTRACTION on rectal examination. If EITHER is present = sacral sparing = INCOMPLETE injury (AIS B minimum). Why sacral segments matter: the sacral fibers run in the most CENTRAL part of the cord — if any function is preserved here, it means the cord is not completely disrupted, and there is potential for further neurological recovery. AIS A (no sacral sparing) = complete injury = much less likely to have significant neurological recovery than incomplete injuries.

NEUROLOGICAL REHABILITATION

110. The 'mirror neuron system' (MNS) is proposed to contribute to motor learning and rehabilitation because:

A. It is the system that controls reflexes

B. Mirror neurons fire BOTH when performing an action AND when OBSERVING someone else perform the same action — providing a neural substrate for learning through observation, imitation, and social modeling

C. It mirrors the spinal cord in the brain

D. It controls proprioception

✓ Answer: B

💡 **Rationale & Explanation:**

Mirror neurons (discovered by Rizzolatti et al. in macaques, 1992): neurons in the premotor and parietal cortex that activate during BOTH execution and OBSERVATION of goal-directed actions. REHABILITATION IMPLICATIONS: OBSERVATION-BASED LEARNING: watching the therapist perform a movement activates similar neural circuits as actually performing it — supports learning by observation; ACTION OBSERVATION THERAPY (AOT): patients watch videos of functional actions, then practice the same actions — shows evidence for improved UE function post-stroke; IMITATION: the MNS supports learning by imitation; MOTOR IMAGERY: mental simulation of movement also activates MNS-related circuits. Evidence for AOT in stroke: moderate (Level 2) — combined with practice is more effective than practice alone. The MNS provides a neurological rationale for DEMONSTRATION, OBSERVATION, and IMITATION in PT instruction.

├— NEUROLOGICAL ASSESSMENT

111. The 'STREAM' (Stroke Rehabilitation Assessment of Movement) measures:

A. Cognitive function

B. Upper extremity voluntary movements, lower extremity voluntary movements, and basic mobility — specific to EARLY STROKE

REHABILITATION, sensitive to small changes in the acute/subacute period

C. Spasticity only

D. Balance only

✓ **Answer: B**

💡 **Rationale & Explanation:**

STREAM (Daley et al., 1997): a standardized test of VOLUNTARY MOVEMENT and BASIC MOBILITY after stroke. Three subscales: UPPER EXTREMITY voluntary movement (30 items); LOWER EXTREMITY voluntary movement (30 items); BASIC MOBILITY (10 items — rolling, sitting, standing, walking). Total 100 points. STREAM is: sensitive to SMALL CHANGES in early stroke recovery (more sensitive than the Barthel for acute-phase improvement); can be used even when a patient cannot stand or walk (the LE and mobility subscales start from bed mobility); useful for setting realistic goals in the acute rehabilitation phase. Used in Canadian and international stroke rehabilitation research. The STREAM complements the FMA (which measures impairment) by also including mobility tasks (which are closer to the activity level of the ICF).

├— NEUROLOGICAL REHABILITATION

112. 'Standing frame' training for patients with complete SCI is beneficial because:

A. It improves voluntary leg movement

B. BONE DENSITY MAINTENANCE (weight-bearing reduces osteoporosis below the injury level), JOINT ALIGNMENT AND CONTRACTURE PREVENTION, CARDIOVASCULAR EFFECTS, BOWEL FUNCTION IMPROVEMENT, and PSYCHOLOGICAL BENEFITS — even without neurological recovery

C. It is equivalent to ambulation

D. Only for incomplete SCI

✓ **Answer: B**

💡 **Rationale & Explanation:**

Standing frame benefits in complete SCI: despite no functional ambulation, daily or regular standing (using a standing frame, tilt table, or standing wheelchair) provides: 1) BONE DENSITY: weight-bearing stimulates osteoblasts — reduces osteoporosis rate below the injury level (SCI patients have high hip/distal femur fracture risk); 2) JOINT ALIGNMENT: maintains ankle/knee/hip alignment, prevents contractures; 3) CARDIOVASCULAR: mild hemodynamic benefits; 4) BOWEL/BLADDER: upright position may improve bowel transit and bladder emptying; 5) SPASTICITY REDUCTION: sustained standing stretch can temporarily reduce extensor spasticity; 6) PRESSURE RELIEF: redistributes pressure from buttocks; 7) PSYCHOLOGICAL: being upright at eye level improves interaction and mood. Recommended: 30-60 minutes/day standing for complete SCI patients. Equipment: EasyStand, Rifton, or tilt-in-space wheelchairs with standing function.

├— PEDIATRIC NEUROLOGY

113. In pediatric rehabilitation, 'constraint-induced movement therapy' (CIMT) for hemiplegic CP is applied:

A. Only after age 10

B. For CHILDREN WITH HEMIPLEGIC CP aged 2+ who have at least minimal hand function — constraining the stronger hand with a cast or mitt for 6-8 hours/day while intensively training the weaker hand with functional tasks

C. For bilateral CP only

D. Without any functional training

✓ **Answer: B**

💡 **Rationale & Explanation:**

CIMT for pediatric hemiplegic CP (Pediatric CIMT / modified CIMT): similar to adult stroke CIMT, adapted for children. The stronger (less-affected) limb is CONSTRAINED (short arm cast or mitt) during waking hours while the child practices intensive, structured functional activities with the weaker hand. Modified versions: HYBRID CIMT (briefer constraintperiods + bimanual training); HAND-ARM BIMANUAL INTENSIVE THERAPY (HABIT — 90 hours of bimanual task practice without constraint — comparable evidence to CIMT). Evidence: CIMT improves QUANTITY of limb use and quality of movement in hemiplegic CP children. Age: effective from 2 years old. Important: must adapt for children — use play-based activities, family training for home carryover. CIMT is the most evidence-based UE intervention for hemiplegic CP.

NEUROLOGICAL REHABILITATION

114. 'Selective serotonin reuptake inhibitors' (SSRIs) such as fluoxetine are being studied in stroke rehabilitation as NEUROPLASTICITY ENHANCERS because:

A. They relieve post-stroke depression only

B. They may ENHANCE CORTICAL EXCITABILITY AND NEUROPLASTICITY independent of antidepressant effects — the FLAME trial showed fluoxetine 20 mg/day for 3 months improved motor recovery in ischemic stroke patients with hemiplegia

C. They reduce spasticity

D. They improve sleep only

✓ Answer: B

💡 Rationale & Explanation:

SSRIs as neuroplasticity enhancers in stroke (FLAME trial, 2011; FOCUS trial, 2019): FLAME (French): fluoxetine significantly improved motor recovery at 3 months compared to placebo — exciting results. FOCUS (UK, 2019): fluoxetine did NOT improve independence on the mRS — a large pragmatic trial showing less benefit. Mechanism: serotonin may

enhance MOTOR CORTEX EXCITABILITY, synaptogenesis, and neuroplasticity through multiple pathways. Current status: MIXED EVIDENCE — not standard of care but areas of ongoing research. PT RELEVANCE: understanding pharmacological adjuncts to neurological rehabilitation helps PTs discuss the evidence with patients and colleagues. Fluoxetine is appropriate for POST-STROKE DEPRESSION (which is very common — ~30% of patients) regardless of its neuroplasticity effects. A patient's mood and motivation significantly impact PT participation and outcomes.

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115. In Parkinson's disease, the 'off' period gait is characterized by:

A. Improved balance and movement

B. SEVERE FREEZING, MARKED FESTINATION, EXTREME BRADYKINESIA — occurring when dopaminergic medication effects are low (at the end of a medication dose); the patient may be unable to initiate or continue walking

C. Good walking speed

D. Normal arm swing

✓ Answer: B

💡 **Rationale & Explanation:**

PD 'on' and 'off' states: Parkinson's disease patients experience fluctuations related to medication cycles. 'ON' period (adequate dopamine effect): movement is improved, gait is more functional, tremor reduced, facial expression better. 'OFF' period (medication wearing off, typically before next dose): SEVERE motor symptoms return — marked bradykinesia, rigidity, tremor; gait is severely impaired with FREEZING OF GAIT (FOG), extreme festination, very small steps; the patient may be unable to move at all. 'WEARING-OFF PHENOMENON' and 'ON-OFF FLUCTUATIONS' become more common as PD advances. PT SCHEDULING RELEVANCE: always schedule PT sessions during the 'ON' period for maximum participation — typically 30-60 minutes after dopaminergic medication. Communicate with the patient and caregivers about their medication schedule. Advanced PD therapy (apomorphine pump, DBS) can smooth fluctuations.

NEUROLOGICAL ASSESSMENT

116. The 'MRC sumscore' in Guillain-Barré syndrome (GBS) during recovery uses:

A. FIM scores

B. SUM of MMT grades for 6 muscles bilaterally (shoulder abduction, elbow flexion, wrist extension, hip flexion, knee extension, ankle dorsiflexion) — maximum 60 — correlates with function and predicts return to ambulation

C. ASIA scale

D. Barthel index

✓ Answer: B

💡 **Rationale & Explanation:**

GBS MRC Sumscore: 6 key muscles are tested bilaterally on the MRC scale (0-5 each): shoulder abductors, elbow flexors, wrist extensors, hip flexors, knee extensors, ankle dorsiflexors. 6 muscles × 2 sides × 5 maximum = MAXIMUM 60 POINTS. Uses: TRACKING RECOVERY: the MRC sumscore improves as nerve regeneration occurs; PREDICTING AMBULATION: scores ≥48/60 at 4 weeks correlates with walking at 6 months; Research standardization for GBS clinical trials. PT uses the MRC sumscore at each assessment: establish baseline, track recovery trajectory, adjust PT intensity (increase as score improves), and guide discharge planning. GBS rehabilitation: MRC <20 = bed-based PT; 20-40 = wheelchair-based with assisted transfers; 40-50 = assisted ambulation; 50-60 = independent ambulation training.

NEUROLOGICAL REHABILITATION

117. 'Neuromuscular taping' (elastic therapeutic tape) for neurological patients is used primarily for:

A. Providing structural support like rigid tape

B. FACILITATING OR INHIBITING MUSCLE ACTIVATION, IMPROVING SENSORY INPUT AND PROPRIOCEPTION, and SUPPORTING JOINT ALIGNMENT without restricting ROM — particularly for facilitating weak muscles and improving postural alignment in stroke or CP

C. Replacing splinting

D. Pain only

✓ Answer: B

💡 **Rationale & Explanation:**

Neuromuscular/kinesiology tape in neurological PT: unlike rigid strapping tape, elastic therapeutic tape moves with the body and provides: 1) SENSORY FACILITATION: the elastic tension on the skin provides constant tactile sensory input that may enhance body awareness and motor control (proprioceptive facilitation theory); 2) MUSCLE FACILITATION: applied in the direction of muscle action with 15-25% tension to facilitate weak muscles (e.g., tibialis anterior for foot drop, deltoid for shoulder subluxation); 3) MUSCLE INHIBITION: applied against the direction of muscle action with 10-15% tension to reduce hyperactive muscles (e.g., spastic bicep); 4) JOINT SUPPORT: positions joints in more optimal alignment. Applications in neuro PT: shoulder subluxation post-stroke (support glenohumeral joint without restricting movement), foot drop facilitation, scapular positioning in CP. Evidence: weak but emerging for shoulder subluxation and positioning.

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118. The 'Schuell-Jenkins-Jimenez-Pabon' (SJJP) aphasia rehabilitation approach focuses on:

A. Compensatory communication strategies only

B. INTENSIVE STIMULATION of language function through high-volume, repetitive, auditory-based stimulation — the damaged language cortex is activated through intensive input, promoting reorganization and recovery

C. Alternative augmentative communication (AAC)

D. Pharmacotherapy

✓ **Answer: B**

💡 **Rationale & Explanation:**

Schuell's stimulation approach to aphasia: Hildred Schuell's foundational approach (1950s-60s): 1) AUDITORY STIMULATION is the primary input channel (auditory comprehension is usually less impaired than expression); 2) INTENSIVE STIMULATION — high frequency, repetitive stimulation of language processes; 3) MEANINGFUL RESPONSE — always require a language response; 4) REPETITION until the response is reliable; 5) MULTIPLE MODALITIES — auditory + visual + reading + writing together. Underlying theory: the brain responds to intensive stimulation by reorganizing — similar to exercise-induced muscle adaptation but for language neural networks. Modern aphasia therapy builds on Schuell's foundations with constraint-induced language therapy (CILT — forces verbal communication, suppresses gesture compensation) and semantic feature analysis. Schuell's approach remains influential in Philippine PT and SLP education.

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119. The 'passive cycle ergometry' for patients with disorders of consciousness (vegetative or minimally conscious state) is used to:

A. Measure cognitive awareness

B. PREVENT DECONDITIONING AND CONTRACTURES, stimulate sensory-motor input (rhythmic proprioceptive input from leg cycling), maintain joint range, and potentially facilitate emergence of consciousness through sensorimotor stimulation

C. Strengthen muscles directly

D. Assess prognosis

✓ **Answer: B**

💡 **Rationale & Explanation:**

Passive cycling (MOTOmed or similar devices) for DoC patients: patients in vegetative state (VS) or minimally conscious state (MCS) cannot voluntarily exercise. Passive cycling provides: 1) JOINT RANGE maintenance (prevents contractures in the lower extremities); 2) MUSCLE MASS preservation (passive movement stimulates some

motor neuron activity via muscle spindle reflexes); 3) CARDIOVASCULAR EFFECTS (passive limb movement modestly increases circulation); 4) SENSORY INPUT: rhythmic proprioceptive input may stimulate arousal and conscious processing; 5) NEUROPLASTICITY stimulus: the repetitive somatosensory input from cycling may promote cortical activation in minimally conscious patients. Emerging evidence suggests combined passive + FES cycling improves spasticity and may facilitate consciousness emergence in MCS patients. Used as part of a comprehensive sensory stimulation program alongside family presence, familiar voices, and purposeful handling.

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120. The 'Chedoke-McMaster Stroke Assessment' (CMSA) is unique because it:

A. Measures ADL independence

B. Stages STROKE RECOVERY using a 7-stage scale for each body segment (shoulder, arm, hand, leg, foot) + postural reactions + mobility — based on Brunnstrom's recovery framework but with clear criteria

C. Measures cognitive function only

D. Tests spasticity level

✓ Answer: B

💡 **Rationale & Explanation:**

Chedoke-McMaster Stroke Assessment (CMSA, Gowland et al.): a comprehensive stroke assessment with two inventories. IMPAIRMENT INVENTORY: 6 subscales each rated 1-7 (Brunnstrom-based): shoulder impairment; arm impairment; hand impairment; leg impairment; foot impairment; postural control. ACTIVITY INVENTORY: gross motor function items (similar to Barthel). STAGE DESCRIPTIONS: clear behavioral criteria for each stage (1-7) help standardize assessment. Strengths: captures limb-specific recovery rather than whole-body function; directly guides therapeutic interventions (knowing the Brunnstrom stage informs what type of facilitation/task is appropriate); good reliability and validity. CMSA is widely used in

Canadian stroke research and is taught in Philippine PT programs as part of neurological assessment.

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121. The 'SMART' approach to post-stroke rehabilitation (self-monitoring, active goal setting, real-world tasks) reflects which motor learning principle?

A. Passive learning

B. ACTIVE, SELF-DIRECTED PARTICIPATION promotes deeper learning, better retention, and higher motivation — aligning with Adult Learning Theory and motor learning evidence that internal feedback and goal-directed practice produce superior outcomes

C. Blocked practice

D. External focus only

✓ Answer: B

💡 **Rationale & Explanation:**

Active vs. passive learning in rehabilitation: patients who are ACTIVE PARTICIPANTS in their rehabilitation (set their own goals, monitor progress, choose meaningful tasks) learn better and maintain gains longer than passive recipients of therapy. ADULT LEARNING THEORY (Knowles): adults are self-directed; learn best through problem-solving related to real-life situations; are internally motivated; need to understand relevance. MOTOR LEARNING EVIDENCE: INTERNAL FOCUS (attention on body movement) vs. EXTERNAL FOCUS (attention on the environmental effect of movement) — external focus generally produces BETTER MOTOR LEARNING (Wulf's constrained action hypothesis). SELF-MONITORING (home diaries, wearable activity trackers) increases adherence to home programs. GOAL-DIRECTED practice: patients who choose personally meaningful functional goals (getting back to cooking, playing with grandchildren) engage more intensely. This philosophy underpins the SMART goals approach in PT documentation.

NEUROLOGICAL ASSESSMENT

122. The 'Tinetti performance-oriented mobility assessment' (POMA) tests:

A. Upper extremity function

B. BALANCE (9 items, 16 points) and GAIT (7 items, 12 points) in older adults — total 28 points; ≤18 = high fall risk; 19-24 = moderate fall risk; 25-28 = low fall risk

C. Cognitive function

D. Spasticity

✓ Answer: B

💡 **Rationale & Explanation:**

Tinetti POMA (Performance-Oriented Mobility Assessment, 1986): developed specifically for OLDER ADULTS. Two sections: BALANCE (9 items, 16 points max): sitting balance, arising from chair, standing balance (immediate, attempted eyes closed, turning 360°, balance with nudge, sitting down); GAIT (7 items, 12 points max): gait initiation, step length/height, step symmetry, gait continuity, path deviation, trunk sway, walking stance. Total 28 points. RISK THRESHOLDS: ≤18 = high fall risk (requires urgent intervention); 19-24 = moderate fall risk (monitoring + prevention program); 25-28 = low fall risk (maintenance). The Tinetti POMA predicts fall risk in community-dwelling elderly and nursing home populations. It is simple, requires only a chair, and takes <15 minutes. Widely used in Philippine geriatric PT and in nursing home settings.

NEUROLOGICAL REHABILITATION

123. Post-traumatic amnesia assessment using the 'Westmead PTA Scale' requires:

A. Weekly testing

B. DAILY testing using 12 items including 12 standardized pictures (must be recalled consistently) plus orientation questions — EXIT

FROM PTA = correct responses on 3 consecutive days of testing (not just one day)

C. Monthly testing

D. Single session assessment

✓ Answer: B

💡 **Rationale & Explanation:**

Westmead PTA Scale: the most widely used PTA scale in rehabilitation. 12 items: face/name recall (3 items — 3 new faces introduced on Day 1, recalled on subsequent days); picture recall (5 items — 5 standardized pictures introduced Day 1, recalled daily); 4 orientation questions (name, date, location, examiner's name). SCORING: 0-12. EXIT FROM PTA CRITERION: patient must score 12/12 on 3 CONSECUTIVE days — one correct day is not sufficient (patients in PTA can have 'islands of lucidity' — correct responses on some days without true emergence from amnesia). Until 3 consecutive correct days: patient remains in PTA and cannot engage in meaningful learning-based rehabilitation. Once PTA resolves: begin formal cognitive rehabilitation, skills training, and community reintegration work.

├— SPINAL CORD INJURY

124. The primary LONG-TERM CAUSE OF DEATH for SCI patients (modern era) is:

A. Pressure ulcers

B. RESPIRATORY DISEASE (pneumonia, respiratory failure) in cervical/high thoracic SCI — and CARDIOVASCULAR DISEASE in all SCI levels (due to inactivity, accelerated cardiovascular risk factors)

C. Autonomic dysreflexia

D. Syringomyelia

✓ Answer: B

💡 **Rationale & Explanation:**

SCI mortality causes: In the MODERN ERA of SCI care (with improved acute management, antibiotics, pressure care), the leading causes of death have shifted: CERVICAL SCI: respiratory complications (pneumonia, respiratory failure) remain the primary cause of premature death; THORACIC/LUMBAR SCI: CARDIOVASCULAR DISEASE has become the leading long-term mortality cause — SCI patients have accelerated cardiovascular risk from: physical inactivity (reduced caloric expenditure), autonomic dysfunction affecting cardiac regulation, dyslipidemia, insulin resistance. Prevention implications: respiratory management (vaccinations, breathing exercises, FES) for cervical SCI; CARDIOVASCULAR PREVENTION (exercise, diet, weight management, cardiovascular monitoring) for all SCI patients. PT role: promote maximal physical activity level possible, teach pulmonary hygiene, support cardiovascular exercise programs.

NEUROLOGICAL REHABILITATION

125. The 'Agrammatic aphasia' pattern (typical of Broca's aphasia) is characterized by:

A. Fluent speech with word-finding errors

B. NON-FLUENT, telegraphic speech omitting GRAMMATICAL FUNCTION WORDS and MORPHEMES ('man walk store' instead of 'the man walked to the store') with PRESERVED COMPREHENSION

C. Jargon with neologisms

D. Normal prosody

✓ Answer: B

💡 Rationale & Explanation:

Broca's aphasia (expressive/agrammatic aphasia): LEFT FRONTAL lesion (Broca's area, BA44-45). SPEECH OUTPUT: NON-FLUENT — reduced spontaneous speech, short utterances, labored; AGRAMMATIC — telegraphic, missing function words (a, the, is), missing morphological endings (-ed, -s, -ing); PROSODY: monotone, missing normal rhythm; REPETITION: impaired; NAMING: impaired; COMPREHENSION:

relatively PRESERVED for simple sentences (though impaired for syntactically complex sentences). The patient knows WHAT they want to say but cannot produce it fluently. Compare: WERNICKE'S APHASIA (fluent, grammatically formed but semantically empty/jargon speech, poor comprehension). PT working with Broca's aphasia: use gesture, drawing, AAC devices to supplement communication; familiar topics; short, simple sentences; give the patient time to respond — do not finish their sentences for them.

NEUROLOGICAL ASSESSMENT

126. The 'Nottingham Sensory Assessment' (NSA) for stroke patients measures:

A. Motor function

B. TACTILE SENSATION (light touch, pressure, pin-prick), PROPRIOCEPTION (joint position sense, kinesthesia), STEREOGNOSIS, and BILATERAL SIMULTANEOUS STIMULATION — providing a comprehensive post-stroke sensory profile

C. Balance only

D. Cognitive function

✓ Answer: B

💡 **Rationale & Explanation:**

Nottingham Sensory Assessment (NSA, Lincoln et al.): a standardized sensory testing battery for post-stroke patients. Domains: TACTILE: light touch (cotton wool), pressure (examiner's finger), sharp/dull (pin-prick vs. finger pad) — on 9 body areas; PROPRIOCEPTION: passive joint movement detection (kinesthesia), joint position matching (proprioception) — wrist, elbow, shoulder, knee, ankle; STEREOGNOSIS: object identification by touch alone (with eyes closed); BILATERAL SIMULTANEOUS STIMULATION: detecting whether one or both sides are touched simultaneously (assessing extinction/neglect of sensory stimuli). Scored: absent, impaired, or normal for each modality per area. The NSA is the most

comprehensive standardized sensory assessment available for stroke and is recommended in evidence-based practice guidelines. Sensory impairment post-stroke affects: hand function rehabilitation, balance, proprioceptive retraining planning, and safety awareness.

NEUROLOGICAL REHABILITATION

127. In multiple sclerosis rehabilitation, the 'Modified Fatigue Impact Scale' (MFIS) is used because:

A. It measures depression

B. MS FATIGUE is a DISTINCT SYMPTOM from depression or deconditioning fatigue — the MFIS specifically measures the impact of fatigue on PHYSICAL (9 items), COGNITIVE (10 items), and PSYCHOSOCIAL (2 items) functioning — total 84 points (0 = no impact, 84 = maximal impact)

C. It replaces exercise testing

D. It measures spasticity

✓ Answer: B

💡 **Rationale & Explanation:**

MFIS (Modified Fatigue Impact Scale, Fisk et al.): 21 items scored 0-4 each, measuring FUNCTIONAL IMPACT of MS fatigue on: PHYSICAL functioning (activities requiring physical effort); COGNITIVE functioning (concentration, memory, thinking); PSYCHOSOCIAL functioning (participation, social activities). Total 0-84 (0 = fatigue has no impact). MCID: approximately 8-10 points. MS fatigue differs from: normal tiredness (not relieved by rest, worse with heat, associated with neurological mechanisms — demyelination, inflammation, autoimmune cytokines, deconditioning); depression-related fatigue (cognitive-emotional focus); deconditioning fatigue (pure physical deconditioning, responds to exercise training). Why assess it separately? To guide specific interventions: MS fatigue → energy conservation + cooling + appropriate aerobic exercise; deconditioning

fatigue → progressive cardiovascular training; depression → CBT + pharmacotherapy.

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128. 'Hydrotherapy (aquatic therapy)' for neurological patients is particularly beneficial because:

A. Water is cold and reduces inflammation

B. WARM WATER (34-36°C) reduces MUSCLE TONE and PAIN, the BUOYANCY allows task practice and movement in patients who cannot bear full body weight on land, HYDROSTATIC PRESSURE provides sensory stimulation and joint support, and WATER RESISTANCE provides gentle proprioceptive feedback for motor control training

C. Cold water cures neurological deficits

D. It replaces land-based therapy entirely

✓ Answer: B

💡 **Rationale & Explanation:**

Aquatic therapy benefits for neurological conditions: TEMPERATURE (34-36°C): warm water REDUCES MUSCLE TONE (spasticity) and pain — especially beneficial for CP, stroke spasticity, MS. BUOYANCY: patients who are non-ambulatory on land can walk, balance, and perform functional tasks in water — allows earlier functional practice; reduces fall risk during training. HYDROSTATIC PRESSURE: compressive sensory input from all sides provides PROPRIOCEPTIVE and tactile stimulation beneficial for motor control and balance. RESISTANCE: water resistance provides variable, direction-dependent resistance for strengthening. PSYCHOLOGICAL: many patients find the pool environment less threatening, more motivating. Evidence: Level 2 for aquatic therapy in CP, MS, PD, stroke. Special populations: excellent for CP children (reduces spasticity), MS patients (heat sensitivity must be managed — keep water at 28-32°C for MS), PD (improves balance and gait), stroke (supplementary to land-based therapy).

NEUROLOGICAL ASSESSMENT

129. The 'Barthel Index' maximum score of 100 does NOT necessarily indicate:

A. Any problem with ADL performance

B. That the patient can live INDEPENDENTLY IN THE COMMUNITY — a score of 100 means the patient can perform the 10 assessed ADLs independently, but they may still need supervision for complex community tasks (driving, managing finances, cooking complex meals)

C. Any motor function

D. Continence

✓ Answer: B

💡 **Rationale & Explanation:**

Barthel Index limitation — score 100 ≠ community independence: a patient can score 100/100 on the Barthel (independent in feeding, bathing, grooming, dressing, bowel, bladder, toilet, transfers, mobility, stairs) AND still require: supervision for community navigation (crossing streets, using public transport); assistance with complex meal preparation; cognitive support (memory deficits may make safe home management unsafe); complex IADLs (instrumental ADLs — managing medications, finances, communication). The Barthel measures BASIC ADLs only. IADL scales (Lawton-Brody, COPM) assess complex community activities. This limitation is important in PT discharge planning — a Barthel of 100 does NOT guarantee safe community discharge without a comprehensive home and community assessment.

NEUROLOGICAL REHABILITATION

130. 'HABIT' (Hand-Arm Bimanual Intensive Training) for hemiplegic CP is different from CIMT in that:

A. HABIT is less intensive

B. HABIT does NOT constrain the stronger hand — instead both hands work TOGETHER in 90 hours of intensive BIMANUAL task practice (activities requiring two-hand coordination: opening jars, tying

shoelaces, playing board games) — improving bimanual coordination rather than unilateral limb use

C. HABIT uses splinting

D. HABIT is only for adults

✓ Answer: B

💡 **Rationale & Explanation:**

HABIT (Gordon et al., Columbia University): an evidence-based intensive therapy for hemiplegic CP that addresses the bimanual coordination deficit. 90 hours over 2-6 weeks of BIMANUAL (two-handed) TASK PRACTICE. Evidence comparison: CIMT improves AMOUNT of limb use (how often the weaker hand is used) and unilateral task performance. HABIT improves BIMANUAL HAND USE (how well both hands work together) — the most functionally important outcome for daily life. Ideally: CIMT and HABIT may complement each other — CIMT first to establish basic limb use, then HABIT to integrate into functional bimanual use. Both require intensities of 60-90 hours to show significant functional gains. Current evidence: HABIT as effective as CIMT for improving overall hand function, with HABIT showing superior bimanual outcomes. Both are evidence-based choices depending on the child's functional goals.

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131. The 'Fugl-Meyer Sensory Assessment' (FMA-S) tests which sensory modalities post-stroke?

A. Pain and temperature

B. LIGHT TOUCH and JOINT POSITION SENSE — each tested at 4 locations bilaterally (shoulder, palm, thigh, sole) — maximum 24 points (0 = no sensation, 2 = normal sensation per area per modality)

C. Two-point discrimination only

D. Stereognosis only

✓ Answer: B

💡 **Rationale & Explanation:**

FMA Sensory Assessment (FMA-S, part of the full FMA): tests two primary sensory modalities: LIGHT TOUCH (exteroception) using cotton

wool at: shoulder, palm of hand, thigh, sole of foot — scored 0 (no sensation), 1 (impaired), 2 (normal) per site × 4 sites × 2 sides = 16 points max. JOINT POSITION SENSE (proprioception/kinesthesia): shoulder, wrist, hip, ankle — scored 0 (no proprioception), 1 (≥75% wrong responses), 2 (<25% wrong responses) = 8 points max. TOTAL FMA-S = 24 points. POST-STROKE SENSORY IMPAIRMENT affects: up to 65% of stroke patients; rehabilitation progress (sensory feedback essential for motor re-learning); safety awareness; functional outcomes. The FMA-S is part of the comprehensive FMA but is sometimes administered as a standalone sensory assessment in stroke evaluation.

├— NEUROLOGICAL ASSESSMENT

132. The 'Aphasic Quotient' on the Western Aphasia Battery (WAB) is calculated from:

A. Hospital records

B. FOUR SUBTESTS: Spontaneous Speech (20 points), Auditory Verbal Comprehension (10 points), Repetition (10 points), Naming (10 points) — totaling 50 raw points, multiplied by 2 = Aphasia Quotient (AQ) maximum 100

C. Two tests only

D. Functional communication only

✓ Answer: B

💡 **Rationale & Explanation:**

Western Aphasia Battery (WAB, Kertesz): the most widely used standardized aphasia assessment. THE APHASIA QUOTIENT (AQ) = the primary severity score. Components: 1) SPONTANEOUS SPEECH (0-20): information content (10 pts) + fluency, grammatical competence, paraphasia (10 pts); 2) AUDITORY VERBAL COMPREHENSION (0-200 raw): yes/no questions (60 pts) + auditory word recognition (60 pts) + sequential commands (80 pts) — converted to 0-10; 3) REPETITION (0-100 raw) → converted to 0-10; 4) NAMING (0-100 raw) → converted to

0-10. Sum of 4 subtests = 0-50 → × 2 = AQ (0-100). AQ INTERPRETATION: 0-25 = very severe; 25-50 = severe; 50-75 = moderate; 75-93.8 = mild; >93.8 = normal. The WAB also classifies the APHASIA TYPE (Broca's, Wernicke's, Conduction, Global, Anomic, etc.) based on the pattern of subtest scores.

NEUROLOGICAL REHABILITATION

133. 'CIMT' for post-stroke patients: a meta-analysis by Kwakkel et al. (2015) found that the MINIMUM EFFECTIVE DOSE is approximately:

A. 5 hours total

B. At least 15-20 HOURS of intensive UE practice during the constraint period — with 6 hours/day × 2 weeks being the standard protocol from Wolf et al.'s EXCITE trial

C. 1-2 hours total

D. 100+ hours

✓ Answer: B

💡 **Rationale & Explanation:**

CIMT dosage evidence: the EXCITE trial (Wolf et al., 2006): 6 hours/day of intensive task practice + 90% daytime constraint for 10 consecutive weekdays = 60 hours total. This protocol showed significant improvements maintained at 1 and 2 years follow-up. MODIFIED CIMT (mCIMT): 3 hours/day of practice + 5 hours/day constraint for 2 weeks — comparable outcomes to full CIMT for some patient subgroups. META-ANALYTIC FINDINGS: the dose of INTENSIVE PRACTICE matters more than the constraint itself — patients with more hours of task practice show greater UE gains. Minimum effective dose: approximately 15-20 hours of intensive task practice total. Below this threshold: limited benefit. Above 60 hours: diminishing returns. PRACTICAL IMPLICATION: schedule adequate time for intensive practice; even brief sessions of daily CIMT-style task practice add up and benefit patients who cannot tolerate 6-hour full protocol.

NEUROLOGICAL ASSESSMENT

134. Post-stroke, the most reliable CLINICAL TEST to differentiate SENSORY ATAXIA from CEREBELLAR ATAXIA without imaging is:

A. CT scan

B. The ROMBERG TEST — sensory ataxia: patient can balance with eyes open (visual compensation) but FALLS with eyes closed (Romberg positive — loses without vision when proprioception is impaired). Cerebellar ataxia: patient sways or falls EVEN WITH EYES OPEN (vision cannot compensate for cerebellar dysfunction)

C. Finger-nose test only

D. Gait speed test

✓ Answer: B

💡 **Rationale & Explanation:**

Sensory vs. cerebellar ataxia clinical differentiation: SENSORY ATAXIA (dorsal column or peripheral neuropathy): proprioception is impaired; vision COMPENSATES — patient walks adequately with eyes OPEN (using vision for spatial feedback); walking deteriorates dramatically with eyes CLOSED or on uneven ground. ROMBERG TEST: POSITIVE (falls or sways significantly with eyes closed). CEREBELLAR ATAXIA: the cerebellum processes all sensory inputs; vision does NOT fully compensate. Patient sways or has wide-based gait EVEN WITH EYES OPEN. ROMBERG: may be positive but the WIDE-BASED GAIT and INTENTION TREMOR are present regardless of visual input. Additional distinguishing features: cerebellar = dysmetria on finger-nose and heel-shin; sensory ataxia = absent or reduced proprioception on testing; cerebellar = nystagmus; sensory ataxia = no nystagmus typically.

NEUROLOGICAL REHABILITATION

135. In pediatric CP, the 'GMFM-88' item 'standing on right foot for 3 seconds' is scored as:

A. Always 0 for hemiplegic CP

B. 2 (PARTIAL): the child attempts the task and completes it at least once but does not consistently hold for 3 seconds; OR 3 (COMPLETE): holds 3 seconds consistently; OR 1 (INITIATES): attempts but cannot complete

C. Pass/fail only

D. Not tested under age 5

✓ Answer: B

💡 **Rationale & Explanation:**

GMFM scoring: each of the 88 items (66 in GMFM-66) is scored on a 4-point scale: 0 = Does not initiate (does not even start attempting the task); 1 = Initiates (begins the task but completes <10% of it); 2 = Partially completes (completes ≥10% but <100% of the task criteria); 3 = Completes (completes the full task as described). Example — standing on one foot for 3 seconds: Score 0 = makes no attempt to lift foot; Score 1 = lifts foot for <0.3 second only; Score 2 = holds for 1-2 seconds (≥10% but not full 3 seconds); Score 3 = holds for 3 full seconds. This precise scoring system allows SENSITIVE DETECTION of small improvements — a child progressing from score 1 to score 2 shows meaningful progress even though they still cannot complete the task. MCID for GMFM-66: approximately 1.58 points (on the 100-point scale).

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136. The 'ABCA' (Active Balance-Based Cerebral Palsy Exercise) approach for improving balance in CP emphasizes:

A. Passive stretching

B. TASK-SPECIFIC BALANCE PRACTICE in progressively challenging environments — standing on unstable surfaces, dual-task walking, perturbation training — driven by MOTOR LEARNING PRINCIPLES rather than passive facilitation

C. Hydrotherapy only

D. Strengthening only

✓ **Answer: B**

💡 **Rationale & Explanation:**

Evidence-based balance training in CP: modern CP balance rehabilitation has moved from passive neurodevelopmental techniques toward ACTIVE, TASK-SPECIFIC, MOTOR-LEARNING-BASED approaches: 1) CHALLENGE the balance system progressively (stable → unstable surfaces); 2) DUAL-TASK training (cognitive + motor simultaneously); 3) PERTURBATION training (reactive balance responses); 4) VIRTUAL REALITY balance games (motivating, provides augmented feedback, quantifies performance); 5) AQUATIC BALANCE training (reduces fall fear, allows practice in safe environment). Evidence: progressive balance training programs improve static balance, dynamic balance, gait, and fall rates in CP children. The GMFCS level guides intensity and task selection: GMFCS I-II = competitive sport-level balance challenges; GMFCS III = stepping and reaching tasks with support; GMFCS IV = supported standing balance tasks.

NEUROLOGICAL ASSESSMENT

137. The 'FONE FIM' (phone-based FIM) is used because:

A. Hospital FIM is inaccurate

B. FOLLOW-UP DATA can be collected by PHONE after discharge — a therapist calls the patient/caregiver and asks standard FIM questions about 18 functional items, allowing tracking of community function outcomes without requiring an in-person visit

C. It is cheaper than in-person assessment

D. It replaces in-person FIM in the hospital

✓ **Answer: B**

💡 **Rationale & Explanation:**

Phone-administered FIM (FONE FIM, Ottenbacher et al.): a validated method for collecting FIM data by TELEPHONE INTERVIEW after

discharge. Used in: 1) OUTCOME TRACKING — following patients after discharge to see if FIM gains are maintained at 3, 6, and 12 months post-rehabilitation; 2) RESEARCH — large-scale outcome studies cannot always conduct in-person follow-ups; 3) CLINICAL QUALITY IMPROVEMENT — monitoring community function after discharge. Validity: excellent correlation with in-person FIM for most items; slightly weaker for motor tasks requiring observation (cognitive items particularly well-validated by phone). The FONE FIM is a pragmatic tool for tracking 'real-world' outcomes after stroke and TBI rehabilitation — an important component of evidence-based outcome monitoring systems.

├— NEUROLOGICAL REHABILITATION

138. 'Constraint-induced aphasia therapy' (CIAT) — the linguistic equivalent of CIMT for aphasia — works by:

A. Teaching sign language as compensation

B. CONSTRAINING verbal communication COMPENSATIONS (gestures, drawing, pointing) and FORCING the patient to USE VERBAL LANGUAGE INTENSIVELY in structured card games and functional tasks — 3 hours/day × 10 days

C. Complete communication rest

D. Passive auditory exposure

✓ Answer: B

💡 **Rationale & Explanation:**

CIAT (Constraint-Induced Aphasia Therapy / Intensive Language-Action Therapy, ILAT): based on CIMT principles applied to language rehabilitation. The patient plays structured card games requiring VERBAL COMMUNICATION to request cards from other players. VERBAL REQUESTS ONLY — no gestures, no writing, no pointing (these 'learned non-use' behaviors are constrained). The forced use of verbal language, combined with the natural social motivation of the game and intensive repetition (hundreds of verbal attempts per session),

drives LANGUAGE REORGANIZATION in the affected left hemisphere. Evidence: high-quality RCTs show CIAT improves: communication ability, naming, word finding, spontaneous speech. Effective in BOTH acute and chronic aphasia. Dose: 3 hours/day × 10 days (30 hours total). The social game format maintains motivation better than drill-based practice.

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139. 'Body weight-supported treadmill training' (BWSTT) for an incomplete SCI patient at the T10 level should start with approximately what body weight support?

A. 0% (full body weight)

B. 30-40% body weight support initially — enough support to allow stepping pattern without excessive collapse, while maintaining sufficient loading to activate CPG and generate therapeutic weight-bearing stimulus — gradually reducing support as strength improves

C. 80-90% body weight support always

D. 50-60% always, never changed

✓ Answer: B

💡 **Rationale & Explanation:**

BWSTT BWS percentage for incomplete SCI: the goal is to find the MINIMUM SUPPORT that allows a near-normal step pattern — too much support = insufficient loading for CPG activation; too little = patient collapses, compensatory patterns dominate. START at 30-40% BWS for most T10 incomplete SCI patients — this allows the patient to bear 60-70% of body weight, which is sufficient for CPG activation and bone/muscle loading. PROGRESSION: reduce BWS by 5-10% each session as the patient's strength and endurance improve. TREADMILL SPEED: start slow (0.3-0.6 m/s), increase as stepping quality improves (target 0.5+ m/s for CPG activation). MANUAL FACILITATION: therapists facilitate hip extension, knee control, and foot placement during each step. OUTCOME GOAL: reduce to 0% BWS (full overground walking) for ASIA C-D patients with adequate strength. This protocol is the evidence-based standard for SCI locomotor training.

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140. The 'Hemispheric' differences in post-stroke rehabilitation outcomes: patients with RIGHT hemisphere strokes often have WORSE REHABILITATION OUTCOMES than those with LEFT hemisphere strokes because:

A. Right hemisphere strokes are always larger

B. DENIAL OF DISABILITY (anosognosia), LEFT SPATIAL NEGLECT, IMPULSIVITY, and POOR INSIGHT into deficits impair rehabilitation participation — the patient doesn't recognize their own deficits and doesn't engage with therapy as effectively

C. Left hemisphere is less important

D. Right hemisphere strokes cause more weakness

✓ Answer: B

💡 **Rationale & Explanation:**

Right hemisphere stroke rehabilitation challenges: 1) ANOSOGNOSIA (denial of illness/disability — up to 30%): patient insists they have no deficit; refuses therapy; cannot understand why they need rehabilitation; 2) LEFT SPATIAL NEGLECT (up to 67% of right hemisphere strokes): functional ADL problems from not processing left-side information; falls; unable to find food on the left side of plate; 3) IMPULSIVITY: attempts unsafe activities without recognizing the risk; high fall rate; 4) POOR INSIGHT: cannot form meaningful goals because they don't recognize their own limitations; 5) VISUOSPATIAL DEFICITS: difficulty with depth perception, spatial relationships, orientation; 6) BEHAVIORAL CHANGES: disinhibition, flat affect, or inappropriate behavior. These 'invisible' deficits often affect prognosis more than the motor deficits. PT strategies: use visual cues (approach from the right, gradually shift to left); structured environments; consistent routines; caregiver education.

NEUROLOGICAL ASSESSMENT

141. The 'UPDRS' (Unified Parkinson's Disease Rating Scale) Part III (motor examination) includes how many items?

A. 5 items

B. 18 ITEMS — rated 0-4 each: tremor, rigidity, bradykinesia, gait, postural stability, arising from chair, facial expression, speech, posture, finger taps, hand movements, rapid alternating movements, leg agility, gait, freezing of gait, postural stability, posture, body bradykinesia

C. 3 items

D. 30 items

✓ Answer: B

💡 **Rationale & Explanation:**

UPDRS Part III (Motor Examination): 18 motor items, each scored 0-4 (0 = normal, 4 = severe). Items include: 3.1 Speech; 3.2 Facial expression; 3.3 Rigidity (neck + 4 limbs = 5 ratings); 3.4 Finger tapping (bilateral = 2 ratings); 3.5 Hand movements (bilateral = 2); 3.6 Pronation-supination (bilateral = 2); 3.7 Toe tapping (bilateral = 2); 3.8 Leg agility (bilateral = 2); 3.9 Arising from chair; 3.10 Gait; 3.11 Freezing of gait; 3.12 Postural stability (pull test); 3.13 Posture; 3.14 Global spontaneity of movement; 3.15 Postural tremor (bilateral = 2); 3.16 Kinetic tremor (bilateral = 2); 3.17 Rest tremor (bilateral = 2); 3.18 Consistency of rest tremor. Maximum Part III score = 132 (though practically 0-60 is the functional range). Updated: the MDS-UPDRS (2008) is the current standard.

NEUROLOGICAL REHABILITATION

142. In ABI (acquired brain injury) rehabilitation, the 'RLA' (Rancho Los Amigos) Levels IV-V cognitive behavior pattern requires PT to:

A. Use complex cognitive tasks

B. PROVIDE A LOW-STIMULATION ENVIRONMENT, use SIMPLE CONSISTENT COMMANDS, allow adequate response time, avoid situations that trigger agitation, use redirection rather than confrontation — the patient is confused and agitated and cannot process complex information

C. Discharge immediately

D. Increase environmental stimulation

✓ **Answer: B**

💡 **Rationale & Explanation:**

Rancho Level IV (Confused-Agitated) and Level V (Confused-Inappropriate) PT approach: LEVEL IV: patient is in PTA, highly agitated, unable to cooperate with therapy, may be aggressive, attention span of seconds. PT: safety first (protective equipment if necessary, safe environment); brief, purposeful handling sessions (5-10 minutes only); avoid activities that increase agitation; consistent team approach; caregiver education. LEVEL V: less agitated but still confused, inappropriate responses, short attention span (minutes), easily distracted, responds to familiar persons/tasks. PT: structured environment; familiar tasks; simple one-step commands; maximum 15-30 minute sessions; consistent therapist; memory aids (whiteboards with daily schedule, orientation materials); caregiver training. The PT must recognize that learning-based rehabilitation is NOT effective during PTA — focus on preventing complications and maintaining physical condition.

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143. 'Functional electrical stimulation' (FES) for SCI: 'FES-rowing' combines upper extremity FES with:

A. Passive leg movement

B. ACTIVE UPPER EXTREMITY ROWING while FES stimulates the lower extremity muscles — significantly increasing VO2 and cardiovascular training intensity beyond arm ergometry alone

C. Aquatic therapy

D. Passive stretching

✓ **Answer: B**

💡 **Rationale & Explanation:**

FES-rowing in SCI: a hybrid exercise modality combining: VOLUNTARY upper extremity rowing (arm pull); ELECTRICALLY STIMULATED lower extremity muscles (quadriceps, hamstrings, gluteals) activated in

synchrony with the rowing motion. Cardiovascular effect: the LARGE muscle mass activated (arms + legs together) dramatically increases VO2 compared to arm ergometry alone — may achieve 70-80% VO2max versus 50-60% with arms alone. Benefits: superior cardiovascular training intensity; activates more muscle mass for metabolic benefits; reduces cardiovascular mortality risk; combines upper and lower extremity training in one session. FES-rowing ergometers (RowStim, RT300 rowing machines with FES): purpose-built for SCI FES exercise. Also available: FES cycling (lower extremity only), FES-assisted hand cycling. These technologies are increasingly available in Philippine rehabilitation centers.

NEUROLOGICAL ASSESSMENT

144. The 'EDSS Step 6' in multiple sclerosis means:

A. Patient can walk independently without any aid

B. PATIENT REQUIRES A WALKING AID (cane, crutch, brace) to walk about 100 meters with or without resting

C. Patient is wheelchair dependent

D. Patient is bed-bound

✓ Answer: B

💡 Rationale & Explanation:

EDSS Step 6 (Kurtzke): requires UNILATERAL OR BILATERAL ASSISTANCE (cane, crutch, or brace) to walk about 100 meters with or without resting. Steps around 6: 5.0 = walks without aid about 200 m; 5.5 = walks without aid about 100 m; 6.0 = INTERMITTENT or UNILATERAL constant assistance (cane, crutch, brace) required to walk 100 m; 6.5 = CONSTANT BILATERAL assistance required to walk 20 m. The transition to step 6 is clinically significant — it marks the patient requiring a walking aid for the first time, a major functional milestone. PT at step 6: optimize walking aid selection and fit; fall prevention; assistive device training; energy conservation for walking; exercises to maintain

lower extremity strength; consideration of power mobility for community distances.

NEUROLOGICAL REHABILITATION

145. The 'spastic paraplegia' in SCI above the conus differs from 'flaccid paralysis' in SCI at or below the conus (conus/cauda equina lesions) in that:

A. Both result in identical presentations

B. ABOVE CONUS (UMN pattern): spasticity, hyperreflexia, bladder is REFLEX (automatic) type — can be triggered to void on schedule; BELOW CONUS / CAUDA EQUINA (LMN pattern): flaccid paralysis, areflexia, bladder is AREFLEXIC (autonomous) type — must be manually expressed or use Credé maneuver

C. Both result in flaccid paralysis

D. Conus injuries always spare the bladder

✓ Answer: B

💡 **Rationale & Explanation:**

Conus vs. cauda equina injury comparison: ABOVE CONUS (T12 and above, upper cord): UMN pattern below the injury (after spinal shock resolves): spasticity, hyperreflexia, Babinski positive; BLADDER: reflex (UMN) bladder — the sacral reflex arc is intact; bladder empties reflexively when full (timed voiding or triggered voiding techniques); BOWEL: reflex bowel — controlled by sacral reflex (digital stimulation triggers reflexive evacuation). CONUS/CAUDA EQUINA (L1-S5 level): LMN pattern — flaccid paralysis, areflexia; BLADDER: areflexic (autonomous, LMN) — detrusor does not contract; must use Credé (manual suprapubic pressure), Valsalva, or clean intermittent catheterization (CIC); BOWEL: areflexic bowel — no reflex evacuation; use manual removal or stoma. PT/nursing must know the bladder/bowel management differences to appropriately plan and educate patients.

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146. Post-stroke 'shoulder subluxation' management in the flaccid phase includes all EXCEPT:

A. Supported positioning of the arm

B. Functional electrical stimulation (FES) to supraspinatus and posterior deltoid

C. Aggressive passive glenohumeral joint traction

D. Kinesiology tape application for joint support

✓ Answer: C

💡 Rationale & Explanation:

Flaccid shoulder management: shoulder subluxation occurs in up to 81% of stroke patients with flaccid upper extremity — the rotator cuff cannot maintain glenohumeral joint integrity without neural support. EVIDENCE-BASED MANAGEMENT: 1) SUPPORTED POSITIONING: arm trough on wheelchair, elevated positioning when in bed, arm sling during ambulation (controversial — may increase neglect); 2) FES: to supraspinatus and posterior deltoid — strongest evidence (Level 1) for reducing subluxation and pain; 3) KINESIOLOGY TAPE: glenohumeral support tape; 4) SUPPORTIVE DEVICES: hemiplegic arm slings, AAOS devices. WHAT TO AVOID: AGGRESSIVE PASSIVE TRACTION on the flaccid shoulder — the capsule and ligaments are lax and cannot withstand traction loading without injury; risk of causing impingement, bursitis, CRPS, and worsening subluxation. Handle the flaccid shoulder gently — never pull on the arm.

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147. 'Constraint-induced language therapy' (CILT) is most effective for which type of aphasia?

A. Global aphasia with no verbal output

B. MILD TO MODERATE NON-FLUENT (BROCA'S) APHASIA with some residual verbal ability — the patient must have SOME verbal output to constrain toward (if there's no verbal output, there's nothing to constrain); high intensity is tolerated best by those with enough function to engage

C. Wernicke's aphasia with fluent jargon

D. Anomia only

✓ **Answer: B**

💡 **Rationale & Explanation:**

CILT patient selection: requires SOME RESIDUAL VERBAL ABILITY — at minimum, single-word production. Why: CILT constrains gestures and compensatory strategies to FORCE verbal output; if the patient has no verbal ability at all (global aphasia), there's nothing to 'release' through constraint. Optimal candidates: MILD-MODERATE BROCA'S APHASIA with single-word or short phrase verbal ability. CHRONIC aphasia (>6 months post-stroke): CILT works in chronic aphasia — neuroplasticity is possible even years after stroke with sufficient intensity and motivation. HIGH MOTIVATION is essential — 3 hours/day of intensive language tasks is demanding. Exclusions: severe cognitive impairment (cannot follow rules of the card game), severe fatigue (MS, TBI with poor endurance). CILT has been used with: stroke, TBI, progressive aphasia — always individually tailored.

├— NEUROLOGICAL ASSESSMENT

148. The 'NIHSS Item 7 (Limb Ataxia)' is specifically testing for:

A. Spasticity

B. CEREBELLAR DYSFUNCTION — tested with FINGER-NOSE-FINGER and HEEL-SHIN tests; scored 0 (absent), 1 (present in one limb), 2 (present in two limbs); this item is scored as ABSENT if the patient cannot understand or is too weak to perform (ataxia must be out of proportion to weakness)

C. Proprioception loss

D. Hemiplegia severity

✓ **Answer: B**

💡 **Rationale & Explanation:**

NIHSS Item 7 Limb Ataxia: FINGER-NOSE-FINGER (FNF) test: examiner's finger is held in the patient's visual field; patient touches their own nose, then the examiner's finger, repeatedly. POSITIVE (ataxia present):

the patient misses the target (dysmetria), especially as they approach the target (intention tremor pattern). HEEL-SHIN test: patient raises one heel, places it on the other knee, and slides it down the shin smoothly. POSITIVE: patient's heel jerks, deviates, or cannot slide smoothly. CEREBELLAR ATAXIA indicates CEREBELLAR STROKE (posterior circulation). IMPORTANT: limb ataxia that is present in a patient with COMPLETE HEMIPLEGIA should be scored 0 (absent) — you cannot assess cerebellar function when limbs are too weak to move. The inability to distinguish weakness from cerebellar incoordination is a key NIHSS scoring principle.

├— NEUROLOGICAL REHABILITATION

149. 'Spinal cord stimulation' (SCS) as an emerging intervention for complete SCI aims to:

A. Regenerate axons

B. ELECTRICALLY STIMULATE THE DORSAL SPINAL CORD below the injury level to modulate the CPG and motor circuits — enabling voluntary leg movement in some individuals who were classified as 'complete' SCI (AIS A) when combined with intensive rehabilitation

C. Replace FES

D. Treat neuropathic pain only

✓ Answer: B

💡 **Rationale & Explanation:**

Epidural spinal cord stimulation (eSCS) for complete SCI: groundbreaking research (Harkema, Angeli, Grahn, Gill et al.): epidural electrodes implanted below the injury level; continuous electrical stimulation of the dorsal spinal cord; when stimulation is ON + the patient is in a harness on a treadmill making voluntary effort → some patients previously classified as AIS A (complete) can generate VOLUNTARY STEPPING MOVEMENTS. Mechanism: the stimulation modulates the CPG and the residual sub-threshold descending connections (which may not be absent even in 'complete' injuries as

classified by ASIA exam). The results suggest the ASIA motor exam may overestimate completeness — some apparently complete injuries may have latent preserved connections that eSCS unmasks. This is one of the most exciting areas of SCI neuroscience research (2014-2024). Currently experimental — not standard clinical practice.

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150. The 'wrist-hand splint' in the POSITION OF FUNCTION for a hemiplegic patient is positioned with:

A. Wrist flexion 30°, fingers full flexion

B. WRIST EXTENSION 20-30°, MCP joints 60-70° flexion, IP joints slight flexion (10-20°), thumb in abduction/opposition — this allows easy release and grasp function

C. Fingers fully extended

D. Wrist neutral, fingers in fist

✓ Answer: B

💡 **Rationale & Explanation:**

Position of function for wrist-hand splint: This is the INTRINSIC-PLUS position that allows: TENODESIS GRASP: wrist extension naturally tightens the extrinsic finger flexors → passive finger flexion for grasp; FUNCTIONAL GRIP: when the wrist extends, the fingers naturally flex to hold objects; PREVENTION OF DEFORMITY: prevents the wrist flexion + finger flexion contracture pattern that develops in flaccid/spastic hemiplegia. Compare: REST SPLINT (for anti-spasticity, worn at night): wrist 0-10°, MCP 45°, IP slightly flexed. DYNAMIC SPLINTS: for allowing controlled movement during tasks. ANTI-SPASTICITY SPLINT: keeps the spastic muscles at their maximum passive length. In post-stroke PT: the correct splint type and position must be chosen based on: flaccid vs. spastic tone; functional goals; sleep vs. daytime use; patient tolerance.

├— STROKE REHABILITATION

151. The NIHSS score at stroke admission is used by PT to:

A. Determine the type of stroke

B. Guide rehabilitation intensity, set realistic goals, and predict likely deficits requiring PT attention — NIHSS 15+ indicates need for intensive multidisciplinary rehabilitation; NIHSS 0-4 = minor stroke (may return home quickly)

C. Prescribe medications

D. Perform surgery planning

✓ Answer: B

💡 **Rationale & Explanation:**

NIHSS (0-42): 0=no stroke; 1-4=minor; 5-15=moderate; 15-20=moderate-severe; >20=severe. PT USES: intensity planning; goal setting; communication with the team about expected deficits. A patient with NIHSS 20 will likely have UE paralysis, aphasia, neglect, and visual field deficits requiring intensive multidisciplinary rehabilitation with long LOS. A patient with NIHSS 3 may require brief PT and early discharge with home program.

├— NEUROLOGICAL ASSESSMENT

152. The 'MoCA' (Montreal Cognitive Assessment) screens for MCI with:

A. 10 items, normal ≥8/10

B. 30-item assessment covering visuospatial/executive, naming, memory, attention, language, abstraction, delayed recall, orientation — score ≥26/30 = normal; 18-25 = mild cognitive impairment

C. 5 items only

D. Blood tests

✓ Answer: B

💡 **Rationale & Explanation:**

MoCA (Nasreddine 2005): more sensitive than MMSE for detecting MILD COGNITIVE IMPAIRMENT. 30 total points. DOMAINS: visuospatial/executive (trail-making, cube copy, clock drawing); naming

(3 animals); memory (5 words, scored at delayed recall); attention (digit span, serial 7s, vigilance); language (sentence repetition, verbal fluency); abstraction (similarities); delayed recall; orientation. Add 1 point if ≤12 years education. Normal: ≥26/30. Essential for post-stroke and TBI cognitive screening in PT. Detects early dementia and MCI better than MMSE due to executive function and visuospatial tests.

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153. The 'Fugl-Meyer UE' maximum score is:

A. 100

B. 66 — testing 33 items each scored 0-2 covering reflexes, synergies, combined movements, wrist and hand function, and coordination

C. 50

D. 26

✓ Answer: B

💡 **Rationale & Explanation:**

FMA-UE details: 66 POINTS (33 items × 2 points). Subscales: shoulder/elbow reflexes (2 pts); flexor synergy (12 pts); extensor synergy (6 pts); combined movements (6 pts); wrist (10 pts); hand (14 pts); coordination/speed (6 pts). MCID: ~4-7 points. The FMA-UE is the criterion standard for measuring post-stroke motor impairment in research. Follows Brunnstrom stages — reflexes and synergistic movements tested first, progressing to selective independent movements.

├— SPINAL CORD INJURY

154. Post-traumatic syringomyelia red flags include:

A. Only increased spasticity

B. New ASCENDING neurological deficits — ascending sensory loss, new weakness above the previous injury level, new pain (especially cape-like in upper extremities), increased spasticity, sweating changes — occurring months to years after SCI

C. Improved function only

D. Fever only

✓ **Answer: B**

💡 **Rationale & Explanation:**

Post-traumatic syringomyelia: a syrinx (fluid-filled cyst) forms within the spinal cord, slowly expands, destroying adjacent cord tissue. RED FLAGS: new ascending neurological deficits (sensory loss traveling upward), new pain, increased spasticity, sweating changes above the injury level. Diagnosis: MRI shows the cystic cavity. Treatment: surgical drainage/shunting if symptomatic. PT RELEVANCE: any new progressive neurological deterioration in known SCI = urgent medical referral before continuing rehabilitation.

NEUROLOGICAL ASSESSMENT

155. The 'DGI' (Dynamic Gait Index) assesses:

A. Static balance only

B. Walking ability under CHANGING CONDITIONS — 8 gait tasks including changing speed, horizontal and vertical head movements, stepping over/around obstacles, stairs, and pivot turns — scored 0-3 each, max 24 — ≤19 = fall risk

C. Upper extremity function

D. Cognitive function

✓ **Answer: B**

💡 **Rationale & Explanation:**

Dynamic Gait Index (Shumway-Cook): 8 tasks: 1) Gait on level surface; 2) Change in gait SPEED; 3) HORIZONTAL head turns; 4) VERTICAL head turns; 5) Pivot and STOP; 6) Step OVER obstacle; 7) Step AROUND obstacles; 8) STAIRS. Each 0-3 (3=normal). Total 0-24. Fall risk: ≤19/24. Challenges DUAL-TASK and ADAPTIVE balance. Useful for: vestibular rehab, stroke, TBI, PD, MS, falls prevention. The FGA (Functional Gait Assessment) is an updated version with better ceiling effects.

NEUROLOGICAL REHABILITATION

156. 'Stroke unit' care compared to general ward care reduces death or dependency by approximately:

A. 5%

B. 18% — the strongest evidence in stroke rehabilitation; Cochrane Systematic Review shows stroke units reduce death, dependency, and institutional care by ~18% each compared to general ward care

C. 50%

D. 2%

✓ Answer: B

💡 Rationale & Explanation:

Stroke unit evidence (Cochrane Stroke Unit Trialists): ABSOLUTE RISK REDUCTION: death reduced ~5%; death or institutionalization ~18%; death or dependency ~18%. WHAT MAKES STROKE UNITS WORK: 24-hour specialist nursing; early and intensive PT/OT/SLP; coordinated MDT meetings; standardized protocols; early mobilization; complication prevention. The stroke unit effect is LARGER than any single drug therapy or individual intervention for stroke. PT students must understand the SYSTEM of care matters, not just individual techniques.

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157. CIMT is most effective for which stroke severity subgroup?

A. Severe stroke (complete hemiplegia)

B. Mild to moderate hemiparesis with preserved wrist and finger extension — the patients who derive the most benefit have SOME existing UE motor function (Brunnstrom Stage 3-5)

C. Only acute stroke (first week)

D. Only chronic stroke (>5 years)

✓ Answer: B

💡 Rationale & Explanation:

CIMT patient selection: BEST CANDIDATES: wrist extension ≥10°, some finger extension ≥10°; Brunnstrom Stage 3-5; no severe cognitive impairment; able to tolerate intensive practice; balance adequate for ambulation with one arm constrained. COMPLETE FLACCID PARALYSIS: no function to constrain toward → CIMT doesn't work. MODERATE HEMIPARESIS: largest CIMT gains (most room for improvement). CHRONIC STROKE: benefits as much as subacute — neuroplasticity preserved years after stroke. The EXCITE trial enrolled 3-9 months post-stroke with maintained improvements at 2 years.

NEUROLOGICAL ASSESSMENT

158. 'DN4' and 'LANSS' questionnaires identify:

A. Spasticity level

B. NEUROPATHIC PAIN COMPONENT — screening tools identifying burning, electric shock, pins and needles, allodynia, hypoalgesia that distinguish neuropathic from nociceptive pain; identifying neuropathic pain changes the treatment approach

C. Balance deficits

D. SCI classification

✓ Answer: B

💡 Rationale & Explanation:

Neuropathic pain tools: DN4 (Douleur Neuropathique en 4 Questions): 10 items; score ≥4/10 = neuropathic pain (sensitivity 83%, specificity 90%). Includes: burning, cold pain, electric shocks, tingling, pins and needles, numbness, itching, + 3 examination items (pin-prick hypoalgesia, brush hypoalgesia, allodynia). LANSS: 7 items; ≥12/24 = likely neuropathic pain. TREATMENT DIFFERENCE: neuropathic pain responds to gabapentin, pregabalin, duloxetine; specific PT interventions (desensitization, TENS, mirror therapy, GMI); traditional musculoskeletal PT may need modification.

NEUROLOGICAL REHABILITATION

159. 'Robotic-assisted gait training' provides which unique advantage?

A. Replaces human PT

B. Allows HIGH-VOLUME, PRECISELY CONTROLLED, CONSISTENT gait training with 500-1000+ steps per session — far more than manually-assisted gait — while quantifying performance and adjusting challenge level in real-time

C. Provides passive stretching only

D. Eliminates fall risk permanently

✓ Answer: B

💡 Rationale & Explanation:

RAGT advantages (Lokomat, Ekso): 1) DOSE: 500-1000 repetitions per 45 minutes (conventional PT produces 30-50); 2) QUANTITATIVE FEEDBACK: graphs of movement smoothness, accuracy, force; 3) ADAPTIVE DIFFICULTY: automatically increases challenge when patient improves; 4) REDUCED THERAPIST BURDEN: one therapist monitors multiple patients; 5) MOTIVATING: gamified interfaces. META-ANALYSIS (2019): robot-assisted gait significantly improves walking speed and distance compared to conventional therapy, particularly for subacute and chronic stroke with moderate-severe impairment.

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160. Higher-intensity balance training for stroke produces:

A. Worse outcomes

B. Better outcomes — systematic reviews confirm ≥4 weeks, 3+ sessions/week, incorporating progressive challenges to all balance systems produces significantly better BBS scores and reduced fall rates than low-intensity programs

C. No difference from low intensity

D. Only marginal improvement

✓ Answer: B

💡 Rationale & Explanation:

Balance training dose-response for stroke: meta-analyses confirm: FREQUENCY: 3-5 sessions/week > 1-2 sessions/week. DURATION: ≥4 weeks required. PROGRESSIVE CHALLENGE: programs increasing difficulty over time produce greater improvements than fixed-difficulty programs. COMBINED APPROACHES: balance + strength + walking = superior to any single modality. TECHNOLOGY-ASSISTED (Nintendo Wii, VR): equivalent to conventional with higher engagement. TAKEAWAY: 'high dose + progressive challenge + multiple systems + meaningful tasks' — not any specific technique or device.

SPINAL CORD INJURY

161. The 'SCIM' is preferred over the FIM for SCI patients because:

A. FIM is more comprehensive

B. SCIM is SPECIFICALLY DESIGNED FOR SCI — captures SCI-specific functional tasks (wheelchair propulsion, SCI-specific bladder/bowel management, SCI-specific mobility) that the FIM inadequately addresses; more responsive to meaningful SCI functional changes

C. FIM is harder to administer

D. SCIM measures impairment

✓ Answer: B

💡 Rationale & Explanation:

SCIM III: 19 items: SELF-CARE (6 items, 0-20 points); RESPIRATION AND SPHINCTER MANAGEMENT (4 items, 0-40 points); MOBILITY (9 items, 0-40 points). Total 0-100. WHY PREFERRED: 1) FIM doesn't capture SCI-specific adaptations (tenodesis grasp independence may score as needing assistance on FIM); 2) SCIM specifically assesses SCI-relevant bladder and bowel management; 3) SCIM includes wheelchair-specific mobility. The FIM was designed for general rehabilitation populations — SCIM better reflects SCI functional status.

NEUROLOGICAL REHABILITATION

162. 'Hippotherapy' mechanism of benefit:

A. Providing psychological distraction only

B. The rhythmic, three-dimensional movement of the horse (mimicking human pelvis during gait at ~3.5 mph) provides PASSIVE GAIT-LIKE SENSORIMOTOR INPUT while the patient rides, activating the same sensorimotor pathways as walking

C. Strengthening only the legs

D. Cardiovascular training

✓ Answer: B

💡 Rationale & Explanation:

Hippotherapy: the HORSE'S WALK produces lateral weight shift, anterior-posterior and rotational pelvis movement — CLOSELY MIMICKING normal human pelvic kinematics during walking. THERAPEUTIC MECHANISM: 1) Passive gait-like CNS input; 2) Active postural stabilization required (trunk and hip stabilizers); 3) Sensory processing (rhythmic tactile, proprioceptive, vestibular input); 4) Neuropsychological benefits. EVIDENCE: CP (Level 1-2): improves gross motor function, balance, gait quality; STROKE: moderate evidence for balance improvement; AUTISM: moderate for social and behavioral benefits.

NEUROLOGICAL ASSESSMENT

163. ISNCSCI must be performed AFTER SPINAL SHOCK because:

A. Spinal shock affects MRI

B. During spinal shock, all reflexes and voluntary function are suppressed below the injury level — a patient in spinal shock appears ASIA A even if incomplete; the true classification is only possible after the bulbocavernosus reflex returns

C. Patient is unconscious

D. ISNCSCI cannot be performed in hospital

✓ **Answer: B**

💡 **Rationale & Explanation:**

ISNCSCI timing: SPINAL SHOCK: immediately after SCI, transient suppression of all cord function below injury level — flaccid paralysis, areflexia, no bulbocavernosus reflex, urinary retention. Classification during spinal shock = almost always ASIA A. RESOLUTION: return of bulbocavernosus reflex (4-12 weeks typically) → true neurological picture emerges. DEFINITIVE CLASSIFICATION: deferred until after spinal shock resolution. INITIAL ASSESSMENT: still performed for injury level identification and treatment planning — just with understanding that it may be revised.

NEUROLOGICAL REHABILITATION

164. 'Bilateral arm training' after stroke:

A. Is never effective

B. May facilitate recovery in moderate-severe hemiparesis — training both arms simultaneously activates bilateral cortical networks, potentially facilitating recruitment of the affected hemisphere in patients who cannot perform CIMT

C. Only works for mild stroke

D. Is identical to CIMT

✓ **Answer: B**

💡 **Rationale & Explanation:**

Bilateral arm training (BAT): simultaneous movement of both arms activates BILATERAL CORTICAL NETWORKS more readily than unilateral. Approaches: BATRAC (bilateral training with rhythmic auditory cueing); ROBOTIC BAT; MIRROR THERAPY (visual-bilateral). EVIDENCE: mixed — some studies show benefits for moderate-severe hemiparesis (where CIMT is not possible); others show comparable but

not superior outcomes to unilateral task practice. BEST USE: as a COMPLEMENT to unilateral task-specific training, particularly for patients too impaired for CIMT.

NEUROLOGICAL ASSESSMENT

165. The 'SARA' scale assesses:

A. PD motor symptoms

B. CEREBELLAR ATAXIA — 8 items: gait, stance, sitting balance, speech, finger chase, nose-finger test, fast alternating hand movements, heel-shin; total 0-40 (0=no ataxia)

C. Spasticity

D. Post-stroke motor recovery

✓ Answer: B

💡 **Rationale & Explanation:**

SARA (Schmitz-Hübsch 2006): validated for cerebellar ataxia. 8 ITEMS (each scored 0-3 or 0-4): 1) Gait (0-8); 2) Stance (0-6); 3) Sitting (0-4); 4) Speech (0-6); 5) Finger chase (0-4); 6) Nose-finger test (0-4); 7) Fast alternating hand movements (0-4); 8) Heel-to-shin (0-4). Used for: spinocerebellar ataxia types, Friedreich's ataxia, cerebellar degenerations. MCID: ~1.5-2 points. Guides rehabilitation goals (which domains to target) and tracks disease progression and intervention effects.

NEUROLOGICAL REHABILITATION

166. The repetition frequency required for meaningful neuroplastic changes in motor cortex is approximately:

A. 5-10 repetitions per session

B. 400-1000 repetitions per session of task-specific movements — significantly more than the 30-50 repetitions typically achieved in

conventional PT sessions; this gap explains why high-dose approaches (CIMT, robotics) produce superior outcomes

C. 50 repetitions per session

D. 1 repetition is enough

✓ Answer: B

💡 **Rationale & Explanation:**

Repetition dose for neuroplasticity (Nudo animal models + human studies): EFFECTIVE CORTICAL REORGANIZATION requires ~400-1000+ repetitions per session. CONVENTIONAL PT: typically 30-50 UE repetitions per hour (studies documenting actual counts). HIGH-DOSE APPROACHES: CIMT = 300-500+ UE reps/hour; ROBOT TRAINING = 500-1000 movements per 45 minutes; GRASP PROGRAM = additional 130-200 reps/day. IMPLICATION: the primary goal of neurological rehabilitation is to MAXIMIZE REPETITION of meaningful, task-specific movement — not any specific technique or technology.

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167. Rancho Level VIII community reintegration goals include:

A. Vegetative care

B. Vocational rehabilitation, driving assessment, return to education or community roles, social reintegration — the patient at Level VIII is purposeful and appropriate but may have subtle cognitive, behavioral, and motor deficits affecting community function

C. Only home exercise

D. Only balance training

✓ Answer: B

💡 **Rationale & Explanation:**

Rancho Level VIII (Purposeful-Appropriate) community goals: patient is ORIENTED, purposeful, appropriate in familiar environments, can initiate ADLs, may drive or work (sometimes with modifications). SUBTLE REMAINING DEFICITS: high-level executive function; fatigue management; personality changes; memory for novel complex information. COMMUNITY REINTEGRATION: 1) DRIVING EVALUATION; 2) VOCATIONAL REHABILITATION: job coaching, gradual return to work;

3) EDUCATION: return to school with accommodations; 4) COMMUNITY NAVIGATION; 5) FATIGUE MANAGEMENT; 6) FAMILY COUNSELING.

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168. Treadmill vs. overground SCI locomotor training: current evidence shows:

A. Treadmill is always superior

B. BOTH approaches are effective for improving walking speed and distance in incomplete SCI, with comparable outcomes; patient preference and clinical setting appropriately guide the choice

C. Overground training is never effective

D. Treadmill is contraindicated above T10

✓ Answer: B

💡 **Rationale & Explanation:**

SCI locomotor training evidence: RCTs and systematic reviews show BOTH treadmill-based (BWSTT ± manual facilitation ± robotic) and OVERGROUND AMBULATION TRAINING produce significant improvements in: 10MWT, 6MWT, independence, balance, LEMS. Neither is clearly superior overall. WHEN TO PREFER TREADMILL: very weak patients (BWS needed); higher training speed and volume possible; when fall risk is too high overground. WHEN TO PREFER OVERGROUND: more functionally specific to real-world ambulation; access to diverse training environments. COMBINED APPROACH: using both modalities may maximize outcomes.

├— NEUROLOGICAL ASSESSMENT

169. The 'Disability Rating Scale' (DRS) for TBI measures:

A. Only motor function

B. ACROSS THE SPECTRUM — from coma to community reintegration — 8 items: eye opening, verbalization, motor response (GCS),

cognitive ability for feeding/toileting/grooming, level of functioning, and employability; range 0-30 (0=normal, 30=death)

C. Only physical function

D. Only cognitive function

✓ Answer: B

💡 **Rationale & Explanation:**

DRS (Rappaport et al.): designed for TBI to track the FULL RECOVERY SPECTRUM. ITEMS: 3 GCS components + cognitive ability for self-care (feeding, grooming, toileting — each for level of assistance) + LEVEL OF FUNCTIONING + EMPLOYABILITY. SCORING RANGES: 0=None; 1=Mild; 2-3=Partial; 4-6=Moderate; 7-11=Moderately Severe; 12-16=Severe; 17-21=Extremely Severe; 22-24=Vegetative; 25-29=Extremely Vegetative; 30=Death. ADVANTAGES: tracks beyond acute hospital; captures community-level functioning (employability); sensitive to change across the full TBI severity spectrum.

├— NEUROLOGICAL REHABILITATION

170. MS heat intolerance (Uhthoff's phenomenon) is managed by:

A. Avoiding all exercise permanently

B. COOLING STRATEGIES — pre-cooling vest/cold drinks before exercise, training in ≤18-20°C environment, scheduling during cooler times; exercise is STILL RECOMMENDED for MS — just with appropriate cooling precautions

C. Hot shower before PT

D. Hot packs for relaxation

✓ Answer: B

💡 **Rationale & Explanation:**

Uhthoff management: historical MISTAKE = restricting exercise for MS due to heat sensitivity. MODERN EVIDENCE: exercise BENEFITS MS (improves fatigue, depression, QoL, balance, function — Level 1). DOES NOT cause relapse or permanent damage. COOLING STRATEGIES: pre-

cooling vest (20-30 min pre-exercise — most effective); cold water immersion before exercise; air-conditioned gym (≤20°C); exercise early morning or evening; cold drinks. EXERCISE INTENSITY: moderate to avoid excessive core temperature rise. PATIENT EDUCATION: temperature-related worsening is TEMPORARY and NOT disease progression.

├— NEUROLOGICAL ASSESSMENT

171. The 'MDS-UPDRS' improves on the original UPDRS by:

A. Being shorter

B. Including NON-MOTOR SYMPTOMS (mood, sleep, fatigue, autonomic dysfunction — Part I), patient-reported ADL experience (Part II), AND the motor examination (Part III), and motor complications (Part IV); the original UPDRS Part I inadequately assessed non-motor features now recognized as major PD disability drivers

C. Removing motor assessment

D. Using only patient reports

✓ Answer: B

💡 **Rationale & Explanation:**

MDS-UPDRS (2008): FOUR PARTS: I = NON-MOTOR EXPERIENCES (13 items — cognition, hallucinations, mood, apathy, anxiety, sleep, daytime sleepiness, pain, urinary, constipation, lightheadedness, fatigue); II = MOTOR EXPERIENCES OF DAILY LIVING (13 items — patient-reported); III = MOTOR EXAMINATION (18 items — clinician-scored); IV = MOTOR COMPLICATIONS (6 items — dyskinesias, OFF periods). KEY IMPROVEMENT: explicitly captures NON-MOTOR SYMPTOMS that are present in 90% of PD patients and are major predictors of quality of life.

NEUROLOGICAL REHABILITATION

172. Perturbation-based balance training (PBBT) specifically trains:

A. Anticipatory balance only

B. THE REACTIVE BALANCE SYSTEM — using unexpected external perturbations (treadmill belt jerks, platform tilts, therapist pushes) to force protective stepping responses; repeated exposure improves the speed and effectiveness of reactive postural responses, significantly reducing falls

C. Gait endurance only

D. Cognitive function

✓ Answer: B

💡 **Rationale & Explanation:**

PBBT: RATIONALE: most neurological falls occur when the patient is PERTURBED (unexpected pushes, slips, trips) and the REACTIVE BALANCE SYSTEM fails. CONVENTIONAL BALANCE TRAINING primarily improves ANTICIPATORY balance (planned movements); modest effects on reactive balance. PBBT: applies CONTROLLED UNEXPECTED PERTURBATIONS → practice reactive stepping. MECHANISM: improves reactive stepping LATENCY (faster protective steps), STEP LENGTH and DIRECTION (larger, more effective steps). EVIDENCE: significantly reduces falls in PD (Level 1), post-stroke (Level 2), elderly fallers (Level 1).

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173. The 'vestibulo-ocular reflex' (VOR) is rehabilitated through:

A. Only surgery

B. Gaze stabilization exercises — patients hold their gaze fixed on a target while actively moving the head; repeated practice RECALIBRATES THE VOR through neuroplasticity in central vestibular pathways

C. Passive head movement only

D. Balance board training only

✓ Answer: B

💡 **Rationale & Explanation:**

VOR gaze stabilization exercises: X1 PARADIGM: keep gaze fixed on a target (letter card at arm's length) while moving the head from side to side (yaw) or up-down (pitch); 2 minutes per session, multiple times daily. MECHANISM: neuroplasticity in vestibular pathways (cerebellum, brainstem) → VOR GAIN recalibrated to compensate for peripheral vestibular deficit. EVIDENCE: strong Level 1 for unilateral vestibular hypofunction — reduces dizziness, improves gaze stability, improves balance. PROGRESSION: start slow → increase speed; eyes open → more challenging targets; static → walking while fixing gaze.

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174. The NEWS score is relevant to PT in acute settings because:

A. Only physicians use NEWS

B. PTs should MONITOR AND RESPOND to NEWS scores — a rising NEWS score (SpO2 drops, RR increases, BP changes) during PT indicates clinical deterioration; PT should modify or stop the session and notify medical staff immediately

C. NEWS only applies to cardiac patients

D. NEWS is a dietary scoring system

✓ **Answer: B**

💡 **Rationale & Explanation:**

NEWS (National Early Warning Score) in PT: NEWS uses 6 parameters (Respiratory rate, SpO2, Systolic BP, Pulse rate, Consciousness level/AVPU, Temperature). TOTAL 0-20+. LOW RISK: 1-4; MEDIUM: 5-6 or single red score; HIGH: 7+ = emergency response. PT USES: a patient with NEWS >5 before PT → consider whether to proceed; NEWS RISING DURING PT → stop activity, reassess, report. SPECIFICALLY: SpO2 <90% during PT = stop; RR >25 = significant; new consciousness change = immediate medical response.

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175. PARM-PAPT collaboration in Philippine rehabilitation includes:

A. Competing for patients

B. Establishing standards of care, developing clinical practice guidelines, advocating for rehabilitation services, and promoting CPD

— physiatrists (PARM) and PTs (PAPT) provide complementary services within the rehabilitation team

C. Replacing each other

D. Only handling billing

✓ Answer: B

💡 **Rationale & Explanation:**

PARM-PAPT collaboration: PARM (Philippine Academy of Rehabilitation Medicine) = professional organization of PHYSIATRISTS (PMR specialists). PAPT = professional organization of PTs. COLLABORATION: national rehabilitation standards; advocacy for PhilHealth rehabilitation coverage; advocacy for government hospital PT resources; CPD programs; guidelines for complex cases. SCOPE CLARITY: physiatrists DIAGNOSE and PRESCRIBE; PTs ASSESS and IMPLEMENT PT treatment. JOINT ADVOCACY: DOH infrastructure investment; PhilHealth coverage expansion; legislation for PWD access to rehabilitation.

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176. Use-dependent cortical plasticity means:

A. Only damaged cortex maps change

B. The cortical representation of a body part EXPANDS or STRENGTHENS proportional to HOW MUCH that body part is used — musicians have larger finger cortical maps; intensive UE training post-stroke expands the affected limb's cortical representation; disuse leads to map shrinkage

C. Maps are fixed after birth

D. Maps only change in children

✓ Answer: B

💡 **Rationale & Explanation:**

Use-dependent cortical plasticity: NUDO'S MONKEY STUDIES (1996): after small cortical strokes, the motor cortex representation of the affected hand SHRANK with disuse but EXPANDED with intensive training. HUMAN NEUROIMAGING: intensive task-specific training → affected hemisphere representation EXPANDS and REORGANIZES.

IMPLICATIONS: 1) Learned non-use = map shrinkage = functional decline; 2) Intensive use of the affected limb = map expansion = recovery; 3) Constraint + intensive practice = maximal map expansion; 4) REPETITION is the key driver of cortical map expansion.

NEUROLOGICAL ASSESSMENT

177. CMSA Postural Control subscale score of '4' for sitting balance means:

A. Cannot sit without support

B. Patient can SIT UNSUPPORTED AND MAINTAIN BALANCE WHILE PICKING UP AN OBJECT FROM THE FLOOR — the highest dynamic demand of the sitting balance subscale

C. Only maintains upright sitting when supported

D. Can sit for 30 seconds only

✓ Answer: B

💡 **Rationale & Explanation:**

CMSA postural control staging for sitting: Stage 1=lying only; Stage 2=sitting with support; Stage 3=unsupported sitting; Stage 4=SITS UNSUPPORTED AND PICKS UP OBJECT FROM FLOOR; Stage 5=sits and moves all directions with full ROM; Stage 6=sits on stool with feet off floor; Stage 7=stepping/reaching in unsupported sitting. A patient at Stage 4 needs training on: dynamic reaching in various directions, weight shifts, protective extension reactions, progressive reaching distance challenges.

NEUROLOGICAL REHABILITATION

178. FIRST intervention for autonomic dysreflexia during a PT session:

A. Administer antihypertensive medication

B. SIT THE PATIENT UPRIGHT — immediately creates orthostatic lowering of BP by 10-20 mmHg via gravity-induced venous pooling; simultaneously begin identifying and eliminating the noxious stimulus (check bladder first — most common cause)

C. Continue PT exercises

D. Call a code immediately

✓ **Answer: B**

💡 **Rationale & Explanation:**

AD management: STEP 1: SIT UPRIGHT IMMEDIATELY — orthostatic BP drop (10-20 mmHg) is the fastest first action; no medications needed initially. STEP 2: FIND AND REMOVE NOXIOUS STIMULUS: check BLADDER first (most common — kinked catheter, full bladder); check BOWEL; check SKIN (tight clothing, pressure sores); check LEGS (DVT, tight bandages). STEP 3: IF BP REMAINS HIGH (SBP >150): administer rapid-onset antihypertensives as prescribed (nitroglycerine paste, nifedipine). SBP >180 = medical emergency.

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179. The 'OPTIMAL theory of motor learning' emphasizes:

A. Negative feedback only

B. OPTIMAL MOTIVATION (enhanced expectancies), FOCUS ON EXTERNAL TASK GOALS (not internal body mechanics), and POSITIVE FEEDBACK — these synergistically enhance neuroplasticity and motor learning more than traditional 'correct the error' coaching

C. Error-based learning only

D. Passive repetition

✓ **Answer: B**

💡 **Rationale & Explanation:**

OPTIMAL theory (Wulf and Lewthwaite, 2016): THREE PILLARS: 1) ENHANCED EXPECTANCIES: setting the learner up for success (positive predictions → actual performance improves → dopaminergic motivation); 2) AUTONOMY SUPPORT: giving choices dramatically improves learning (intrinsic motivation); 3) EXTERNAL FOCUS: focusing on the ENVIRONMENTAL GOAL ('push your foot into the floor') rather

than internal body mechanics ('contract your quadriceps') → better motor learning (Constrained Action Hypothesis). APPLICATION: direct attention to the movement outcome; give patients choices; celebrate successes; frame exercises positively.

NEUROLOGICAL ASSESSMENT

180. The 'Dynamic Visual Acuity Test' (DVAT) measures:

A. Static vision only

B. The decrease in visual acuity when the head is moving — in VOR dysfunction, the VOR is insufficient to stabilize gaze during head movement, reducing visual acuity by ≥2 Snellen chart lines (oscillopsia)

C. Peripheral vision

D. Balance only

✓ Answer: B

💡 Rationale & Explanation:

DVAT: 1) Measure STATIC visual acuity (Snellen chart, head still); 2) Measure visual acuity while the examiner oscillates the patient's head at ~2 Hz. NORMAL: acuity decreases NO MORE than 1 Snellen line. POSITIVE (vestibular hypofunction): 2+ line decrease = VOR insufficiency. COMPUTERIZED DVAT: automated version with precise head velocity monitoring. CLINICAL USES: screen for vestibular hypofunction; monitor recovery during vestibular rehab; identify affected side. Combined with head impulse test (HIT) for comprehensive vestibular assessment.

NEUROLOGICAL REHABILITATION

181. A TIA should prompt PT to:

A. Continue normal PT without concern

B. IMMEDIATELY REFER BACK TO MEDICAL CARE — TIA is a medical emergency with up to 10% stroke risk within 48 hours; a PT observing TIA symptoms should call emergency services, document what was observed, and monitor vital signs while waiting

C. Prescribe exercise immediately

D. Ignore brief neurological symptoms

✓ Answer: B

💡 Rationale & Explanation:

TIA recognition and PT response: ABCD2 SCORE: Age ≥60 (1), BP ≥140/90 (1), Clinical features — unilateral weakness (2) or speech disturbance (1), Duration ≥60 min (2) or 10-59 min (1), Diabetes (1). Score 6-7 = HIGH RISK (>8% 48hr stroke risk). PT RESPONSE: STOP the session; CALL emergency services; DOCUMENT (time of onset, symptoms, duration, resolution); MONITOR vital signs. A TIA survivor needs urgent imaging, echocardiography, and anticoagulation assessment within hours — this is not a wait-and-see situation.

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182. ALS 'overwork weakness' means the PT should:

A. Prescribe maximum exercise

B. Carefully DOSE exercise to avoid fatiguing already maximally-loaded surviving motor neurons — moderate intensity (RPE ≤13, 60% 1RM max), aerobic exercise preferred, avoid exercise to fatigue, reduce next session if fatigue persists >30 minutes post-exercise

C. Prescribe no exercise

D. Only water exercise

✓ Answer: B

💡 Rationale & Explanation:

ALS overwork weakness: ALS = progressive motor neuron loss → surviving motor neurons SPROUT to reinnervate abandoned fibers (compensatory reinnervation) → already working at maximum capacity. OVERWORK WEAKNESS: excessive exercise demand on maximally-loaded neurons → fatigue + accelerated loss of function. EXERCISE GUIDELINES: LOW TO MODERATE INTENSITY; AEROBIC

EXERCISE (cycling, swimming) — evidence shows benefit without harm in early-mid stage; STRENGTHENING only in muscles ≥3+/5; no exercise to fatigue; ADEQUATE RECOVERY between sessions. MONITORING: if new weakness appears after exercise (not present before) → exercise was excessive → reduce load/duration.

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183. Therapeutic alliance in rehabilitation research shows:

A. No measurable effect on outcomes

B. Patients with STRONG THERAPEUTIC ALLIANCES show better adherence, greater motivation, higher satisfaction, better self-efficacy, and SUPERIOR FUNCTIONAL OUTCOMES — the relationship is a 'common factor' in rehabilitation effectiveness

C. Only affects patient satisfaction scores

D. Only affects documentation quality

✓ Answer: B

💡 **Rationale & Explanation:**

Therapeutic alliance in rehabilitation: well-studied in psychotherapy, increasingly in rehabilitation. PATIENTS with strong PT-patient alliances: attend more sessions, practice more at home, report therapy as more helpful, ACHIEVE BETTER FUNCTIONAL OUTCOMES. COMPONENTS: TRUST (competence + caring); EMPATHY; COLLABORATION (goals set together); POSITIVE REGARD (dignity + respect). PHILIPPINE CULTURAL CONTEXT: leverage warmth, family-centeredness, collectivism; be aware of how cultural deference to authority might affect honest symptom communication — encourage open dialogue within the respectful cultural framework.

├— SPINAL CORD INJURY

184. The '6-Minute Push Test' (6MPT) measures:

A. Upper limb strength

B. WHEELCHAIR PROPULSION PERFORMANCE — the distance propelled in 6 minutes in a manual wheelchair; analogous to the 6MWT for ambulatory patients; measures cardiovascular endurance and functional wheelchair mobility

C. Balance while seated

D. Transfer ability

✓ **Answer: B**

💡 **Rationale & Explanation:**

6MPT: patient propels their manual wheelchair over a flat course for 6 minutes; distance recorded. NORMATIVE VALUES: vary by SCI level; complete thoracic SCI typically 700-1200m; cervical SCI typically 400-800m. CLINICAL USES: fitness assessment; cardiac rehab outcomes in SCI; wheelchair sport performance monitoring; compare with functional independence measures. SHOULDER OVERUSE: wheelchair users are at high risk for rotator cuff injuries from propulsion → assess propulsion technique and wheelchair setup as part of shoulder injury prevention.

├— NEUROLOGICAL REHABILITATION

185. Robot-assisted UE training provides which unique advantage:

A. It is cheaper

B. Provides 500-1000+ movement repetitions per 45-minute session with quantitative performance feedback and real-time challenge adaptation — enabling evidence-based dose escalation impossible in conventional therapy

C. Replaces PT entirely

D. Only works for acute stroke

✓ **Answer: B**

💡 **Rationale & Explanation:**

Robot-assisted UE training advantages (MIT-Manus, InMotion, Armeo): 1) DOSE: 500-1000 reps per 45 minutes; 2) QUANTITATIVE FEEDBACK:

graphs of movement smoothness, accuracy; 3) ADAPTIVE DIFFICULTY: challenge automatically increases; 4) REDUCED THERAPIST BURDEN per patient; 5) MOTIVATING: gamified interfaces. META-ANALYSIS (2019): robot-assisted UE training significantly improves FMA-UE and activities vs. conventional therapy, particularly for subacute and chronic stroke with moderate-severe UE impairment. LIMITATIONS: high cost; limited hand training capability; may reduce active effort if haptic rendering is too strong.

NEUROLOGICAL ASSESSMENT

186. The SPPB (Short Physical Performance Battery) components are:

A. Only walking speed

B. Standing balance (tandem, semi-tandem, side-by-side for 10 seconds each), 4-meter walking speed, and chair stand (5 times) — each scored 0-4; total 0-12; score ≤9 predicts increased fall risk, disability, and mortality

C. Only lower extremity strength

D. Only balance

✓ Answer: B

💡 **Rationale & Explanation:**

SPPB: 3 brief tests: STANDING BALANCE (0-4 pts): tries to hold side-by-side (0-1), semi-tandem (0-1), full tandem stance for 10 seconds (0-2). 4-METER WALK SPEED (0-4 pts). CHAIR STANDS — time for 5 reps (0-4 pts). Total 0-12. CLINICAL SIGNIFICANCE: ≤9/12 = increased fall, disability, hospitalization, and mortality risk. Each component identifies the limiting factor (balance, speed, or strength) → guides specific rehabilitation. Easy to administer, no special equipment — ideal for Philippine community health and rehabilitation settings.

NEUROLOGICAL REHABILITATION

187. Progressive resistance training after stroke:

A. Increases spasticity

B. IMPROVES strength, function, and walking speed WITHOUT INCREASING SPASTICITY — multiple Level 1 RCTs contradict the older Bobath view that resistance training worsens spasticity or reinforces abnormal movement patterns

C. Is only for mild stroke

D. Requires isokinetic machines

✓ Answer: B

💡 **Rationale & Explanation:**

Resistance training and spasticity in stroke — evidence evolution: OLDER BOBATH VIEW: resistance training would increase spasticity, reinforce pathological synergies. MODERN EVIDENCE (multiple Cochrane reviews): PRT after stroke SIGNIFICANTLY IMPROVES strength; SIGNIFICANTLY IMPROVES functional outcomes (gait speed, balance, ADL); DOES NOT increase spasticity. RECOMMENDATION: resistance training should be a ROUTINE COMPONENT of stroke rehabilitation — addressing both neurological impairment AND secondary muscular deconditioning. Both isolated and functional strengthening exercises are appropriate.

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188. Virtual reality gaming (VRG) for balance and gait rehabilitation primarily benefits through:

A. Entertainment only

B. DOSE — VRG enables significantly MORE REPETITIONS of balance-challenging movements per session in a motivating, engaging environment that reduces perceived exertion and increases session duration; the dose advantage is the primary mechanism

C. Visual feedback only

D. Competition between patients

✓ Answer: B

💡 **Rationale & Explanation:**

VRG in rehabilitation — dose and motivation: DOSE ADVANTAGE: a patient doing conventional balance exercises may manage 15-20 minutes; the same patient playing a VRG balance game continues for 30-45 minutes, performing 3-5× more balance challenges. ENGAGEMENT FACTORS: immediate feedback, progression, gamification, novelty. EVIDENCE: Nintendo Wii-based balance training = moderate evidence for improving balance in stroke, TBI, PD, elderly fallers. LIMITATIONS: fall risk (must supervise); visual sensitivity (simulator sickness); game outcome doesn't always transfer — must combine with real-world task practice.

NEUROLOGICAL ASSESSMENT

189. The 'Push and Release Test' assesses:

A. Anticipatory balance

B. REACTIVE POSTURAL RESPONSES — the examiner suddenly removes support from a patient leaning backward; normal = single rapid stepping response; abnormal = multiple shuffling steps or fall; indicates impaired reactive balance common in PD and elderly fallers

C. Static balance only

D. Gait speed

✓ Answer: B

💡 **Rationale & Explanation:**

Push and Release Test: patient stands with examiner behind them; patient LEANS BACK against the examiner's hands; WITHOUT WARNING, examiner RELEASES. NORMAL: single STEP-STRATEGY recovery. MODERATE IMPAIRMENT: multiple shuffling steps (festination in PD). SEVERE: falls backward. More sensitive and safer than the standard pull test (UPDRS) for detecting early postural instability in PD (Munhoz et al., 2004). Used to: identify patients needing reactive balance training; predict fall risk; monitor treatment response.

NEUROLOGICAL REHABILITATION

190. CIMT dose-response: the critical determinant of UE gains is:

A. Only the constraint component

B. GREATER NUMBER OF TOTAL PRACTICE HOURS — the amount of intensive task-specific practice; constraint alone without sufficient practice produces minimal change; more practice hours → larger FMA-UE gains and greater cortical reorganization

C. Using a thicker mitt

D. Older patients respond better

✓ Answer: B

💡 **Rationale & Explanation:**

CIMT dose-response: META-ANALYTIC FINDINGS (Kwakkel, Veerbeek et al.): INTENSIVE PRACTICE HOURS are the critical determinant. COMPONENT ANALYSIS: intensive practice alone produces significant UE improvements; constraint alone produces minimal change. CONCLUSION: the CONSTRAINT is a mechanism to enforce intensive practice — INTENSIVE PRACTICE is the active ingredient. This explains why modified CIMT (less practice time) shows proportionally smaller but meaningful gains. PRACTICAL IMPLICATION: maximize TIME ON TASK, not time in constraint.

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191. The AVERT trial lesson for early stroke mobilization:

A. Very early intensive mobilization always improves outcomes

B. VERY EARLY INTENSIVE MOBILIZATION (VEM — starting within 24 hours with multiple short bouts daily) had WORSE outcomes at 3 months; the key was the FREQUENCY AND INTENSITY of very early mobilization — gentle appropriate early mobilization (24-48 hours, once or twice daily) remains the recommendation

C. Early mobilization has no benefit

D. Only late mobilization is effective

✓ **Answer: B**

💡 **Rationale & Explanation:**

AVERT (2015): VEM vs. usual care (which already included early mobilization). VEM group: significantly LESS favorable outcome at 3 months. INTERPRETATION: 1) Very early INTENSIVE mobilization may stress the acute stroke brain (impaired cerebral autoregulation, physiological instability); 2) 'Usual care' was not bed rest; 3) The QUANTITY and INTENSITY in the first 24 hours was the problem, not early mobilization per se. CURRENT GUIDANCE: gentle, appropriate early mobilization (24-48 hours) = STILL RECOMMENDED; multiple intensive sessions per day in the first 24 hours = CAUTION.

NEUROLOGICAL ASSESSMENT

192. The SINGLE BEST PREDICTOR of post-stroke UE motor recovery is:

A. Age

B. Initial UE motor function at baseline (days 1-3) — especially the presence of ANY active wrist and finger extension within the first days; absence of any movement at 4 weeks = <25% chance of meaningful recovery

C. Stroke size on CT

D. Patient motivation

✓ **Answer: B**

💡 **Rationale & Explanation:**

UE prognosis in stroke: KEY FINDING: initial UE motor function = strongest predictor of UE outcome. SPECIFIC: presence of active WRIST EXTENSION by day 3-7 → sensitivity ~90% for good UE outcome. ABSENCE of any UE movement at 4 weeks → <25% chance of meaningful recovery. PREP ALGORITHM: SAFE score (shoulder abduction + finger extension, 0-8) at 3 days + neuroimaging + TMS for personalized prognosis. CLINICAL IMPLICATION: patients with some

active wrist/finger extension in week 1 → intensive CIMT-eligible therapy → high probability of functional hand recovery.

NEUROLOGICAL REHABILITATION

193. Forced exercise (high-cadence cycling) for Parkinson's disease:

A. Only improves cardiovascular fitness

B. Tandem cycling at HIGH SPEED (80-90 RPM) above the patient's voluntary rate produces SUPERIOR MOTOR IMPROVEMENTS (bradykinesia, rigidity, tremor) compared to voluntary cycling — high-frequency sensorimotor input to the basal ganglia may normalize abnormal oscillatory patterns

C. Increases tremor

D. Is the standard PD treatment

✓ Answer: B

💡 **Rationale & Explanation:**

Forced exercise in PD (Jay Alberts, Cleveland Clinic): KEY FINDING: high-cadence forced cycling (~35% above voluntary rate) → significantly greater UPDRS motor improvements vs. self-paced cycling. MECHANISM: high-frequency somatosensory input may normalize abnormal basal ganglia oscillations (similar mechanism to DBS). EVIDENCE: multiple RCTs from the Alberts group showing motor benefits. PRACTICAL: stationary tandem cycling with a partner or motor-assisted ergometer. EXERCISE PRESCRIPTION: 45 minutes, 3×/week, at 80-90 RPM forced cadence.

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194. Deep brain stimulation (DBS) coordination with PT:

A. Makes PT unnecessary

B. DBS dramatically reduces PD symptoms — PT takes advantage of the IMPROVED MOTOR FUNCTION during DBS ON state to maximize rehabilitation gains; PT must also consider DBS settings when prescribing exercise activities

C. Eliminates all symptoms permanently

D. Increases spasticity

✓ **Answer: B**

💡 **Rationale & Explanation:**

DBS and PT coordination: STN-DBS: reduces tremor, rigidity, bradykinesia in PD; reduces medication. PT IMPLICATIONS: 1) TIMING: PT most effective during DBS ON state; 2) DBS SETTINGS: high-intensity exercise can sometimes alter stimulation effects — coordinate with DBS programmer/neurologist; 3) GOALS: with DBS, previously impossible tasks may become achievable → set more ambitious goals; 4) LSVT-BIG: initiate after DBS settings are optimized; 5) MEDICATION REDUCTION: may occur post-DBS → monitor for unexpected motor changes.

NEUROLOGICAL ASSESSMENT

195. The 'ARAT' (Action Research Arm Test) has how many items in how many subscales?

A. 19 items, 4 subscales — GRASP, GRIP, PINCH, GROSS MOVEMENT

B. 10 items, 3 subscales

C. 25 items, 5 subscales

D. 14 items, 2 subscales

✓ **Answer: A**

💡 **Rationale & Explanation:**

ARAT: 19 items in 4 subscales: GRASP (6 items — objects of various sizes): tests gross grasp. GRIP (4 items — cylindrical glass, pipe, pouring water): tests power grip. PINCH (6 items — ball bearing, marble, alloy pin, coin): tests lateral and three-jaw chuck pinch. GROSS ARM MOVEMENT (3 items — hand to back of head, top of head, mouth): tests gross UE mobility. Scoring: 0=cannot perform; 1=partially; 2=slowly/abnormally; 3=normally. Total 0-57. MCID: ~5.7 points. HIERARCHY: if the hardest item is passed, easier items are

scored as passed (speeds testing). Used alongside FMA-UE for comprehensive post-stroke UE assessment.

NEUROLOGICAL REHABILITATION

196. Locomotor training progression in SCI follows:

A. Random order

B. PASSIVE ASSISTED STEPPING → ACTIVE ASSISTED STEPPING → ACTIVE STEPPING WITH REDUCED BWS → STEPPING WITH MINIMAL BWS → OVERGROUND AMBULATION WITH ASSISTIVE DEVICE → COMMUNITY AMBULATION — each step requires meeting specific criteria

C. Surgery first

D. Aquatic therapy only

✓ Answer: B

💡 **Rationale & Explanation:**

Locomotor training progression for incomplete SCI: Level 1: BWS 40-50%, low speed, full manual facilitation. Level 2: BWS 30-40%, increasing speed, partial facilitation. Level 3: BWS 20-30%, faster speed, minimal facilitation (target ≥0.5 m/s). Level 4: BWS <20% or 0%, assistive device, overground walking. Level 5: community integration (outdoor surfaces, inclines, stairs). CRITERIA FOR PROGRESSION: improving stepping quality (less facilitation needed), improving 10MWT and 6MWT, better single-limb stability. TIMELINE: highly variable — depends on injury completeness (ASIA), level, time since injury, patient effort.

NEUROLOGICAL ASSESSMENT

197. The 'STREAM' assessment for stroke is sensitive in early recovery because:

A. It only tests walking

B. It includes BED MOBILITY AND EARLY TRANSFER ITEMS in its 30 lower extremity items — allowing measurement even when patients cannot stand or walk; this floor effect advantage means STREAM detects early improvements that BBS or TUGT would miss

C. It is faster than other tests

D. It uses a visual analogue scale

✓ Answer: B

💡 **Rationale & Explanation:**

STREAM sensitivity in early stroke: items at ALL LEVELS (rolling in bed → lying to sitting → sitting balance → sitting to standing → walking) allows EARLY ASSESSMENT (day 3-7 post-stroke) when most patients cannot yet stand. BBS floor effect in acute stroke: many patients score 0-5 in first days, making it insensitive to early change. STREAM captures QUALITY OF VOLUNTARY MOVEMENT at all levels of recovery. Clinical use: start with STREAM in acute phase → transition to BBS and walking tests as patient progresses → community-level assessments at discharge.

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198. The Rivermead Mobility Index (RMI) consists of:

A. 50 items

B. 15 ITEMS ranging from turning over in bed to running — scored yes/no; total 0-15; practical, quick, captures the full spectrum from bed mobility to community ambulation

C. Only walking items

D. 20 items

✓ Answer: B

💡 **Rationale & Explanation:**

RMI (Collen et al., 1991): 15 mobility items: 1) Turning over in bed; 2) Lying to sitting; 3) Sitting at edge 10 sec; 4) Transfer bed to chair; 5) Standing 10 sec; 6) Transfer floor to chair; 7) Walking 10m indoors (with aid); 8) Climbing stairs; 9) Walking 10m outdoors uneven terrain; 10) Walking 10m indoors without aid; 11) Picking up an object; 12)

Walking 50m without aid; 13) Bathing independently; 14) Walking up/down 4 steps; 15) Running. MCID ~2 points. Quick (5 minutes), full spectrum, used in inpatient stroke rehabilitation to track progress from bed mobility through community ambulation.

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199. The 'FOUR score' improves on the GCS by:

A. Being shorter

B. Including BRAINSTEM REFLEXES and RESPIRATORY PATTERNS that provide additional prognostic information; crucially, the FOUR score can assess intubated patients without losing precision (GCS verbal = 1 for all intubated patients, losing granularity)

C. GCS is more comprehensive

D. FOUR requires special equipment

✓ Answer: B

💡 **Rationale & Explanation:**

FOUR Score (Wijdicks et al.): 4 components (each 0-4): EYE RESPONSE; MOTOR RESPONSE; BRAINSTEM REFLEXES (corneal, pupillary, cough); RESPIRATION (includes intubated vs. not, breathing patterns). Total 0-16. KEY ADVANTAGE over GCS: BRAINSTEM REFLEXES component provides posterior fossa and brainstem information not captured by GCS; INTUBATED PATIENTS: GCS verbal = 1 for all intubated patients (no granularity); FOUR score has a specific respiratory component that provides meaningful data for intubated patients.

NEUROLOGICAL REHABILITATION

200. The 'STAIR consensus principles' for stroke rehabilitation trials recommend:

A. Use of very small sample sizes

B. PATIENT SELECTION (clinically relevant subgroups), DOSE SPECIFICATION (explicit training hours), OUTCOME HIERARCHY (impairment through participation), TIMING (acute vs. chronic), and

COMPARISON CONDITIONS (matching dose between groups) — to improve quality and translational relevance of stroke rehabilitation research

C. Publication of positive trials only

D. Only academic center participation

✓ Answer: B

💡 **Rationale & Explanation:**

STAIR (Stroke Therapy Academic Industry Roundtable): published consensus guidelines for high-quality stroke rehabilitation RCTs. KEY RECOMMENDATIONS: 1) PATIENT SELECTION: define stroke type, severity, time; 2) DOSE: explicitly describe total duration, frequency, intensity, content; 3) OUTCOME HIERARCHY: primary outcome should be activity-level; include patient-reported outcomes; 4) CONTROL CONDITIONS: match therapy TIME between groups; 5) TIMING: pre-specify acute/subacute/chronic stroke; 6) MECHANISM STUDIES: include neuroimaging or neurophysiology when possible. These principles, when followed, produce research more applicable to Philippine PT clinical practice.

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201. The 'Westmead PTA Scale' EXIT criterion requires:

A. One correct day

B. THREE CONSECUTIVE DAYS of 12/12 correct responses — a single correct day is insufficient because patients in PTA can have 'islands of lucidity'; only 3 consecutive days confirms true PTA emergence

C. Weekly testing

D. Monthly testing

✓ Answer: B

💡 **Rationale & Explanation:**

Westmead PTA Scale: 12 items (3 face/name recalls + 5 picture recalls + 4 orientation questions). EXIT FROM PTA = 12/12 correct on 3 CONSECUTIVE DAYS. One or two correct days does not confirm PTA resolution — patients in PTA can score 12/12 on isolated days without true emergence (islands of lucidity). Until 3 consecutive correct days:

patient remains in PTA and cannot engage in meaningful learning-based rehabilitation. Once PTA resolves: begin formal cognitive rehabilitation, skills training, and community reintegration work.

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202. The primary long-term cause of death in thoracic/lumbar SCI patients (modern era) is:

A. Pressure ulcers

B. CARDIOVASCULAR DISEASE — SCI patients have accelerated cardiovascular risk from physical inactivity, autonomic dysfunction, dyslipidemia, and insulin resistance; PT role includes promoting maximal physical activity and cardiovascular conditioning to reduce this risk

C. Autonomic dysreflexia

D. Syringomyelia

✓ Answer: B

💡 **Rationale & Explanation:**

SCI mortality causes — modern era: CERVICAL SCI: respiratory complications (pneumonia, respiratory failure) remain the primary cause. THORACIC/LUMBAR SCI: CARDIOVASCULAR DISEASE has become the leading long-term cause — inactivity → accelerated cardiovascular risk factors (dyslipidemia, insulin resistance, reduced metabolic rate). PT role: promote maximal physical activity possible, support cardiovascular exercise programs (FES cycling, arm ergometry, wheelchair sports), teach pulmonary hygiene for cervical SCI, support cardiovascular risk factor management.

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203. 'Standing frame' training for complete SCI provides all benefits EXCEPT:

A. Bone density maintenance

B. RESTORATION OF VOLUNTARY LEG MOVEMENT — standing frames maintain bone density, prevent contractures, provide cardiovascular effects, improve bowel function, and offer psychological benefits, but do NOT restore voluntary movement in complete SCI

C. Joint alignment and contracture prevention

D. Psychological benefits of upright positioning

✓ **Answer: B**

💡 **Rationale & Explanation:**

Standing frame benefits in complete SCI: BONE DENSITY: weight-bearing stimulates osteoblasts → reduces osteoporosis rate below the injury level (high hip/distal femur fracture risk in SCI). JOINT ALIGNMENT: maintains ankle/knee/hip alignment, prevents contractures. CARDIOVASCULAR: mild hemodynamic benefits. BOWEL/BLADDER: upright position may improve bowel transit. SPASTICITY REDUCTION: sustained standing stretch can temporarily reduce extensor spasticity. PSYCHOLOGICAL: being upright at eye level improves interaction and mood. DOES NOT: restore voluntary movement in complete SCI. Recommended: 30-60 minutes/day.

├— PEDIATRIC NEUROLOGY

204. Primitive reflex integration: the MORO REFLEX is normally integrated by:

A. Birth

B. 4-6 months of age — persistence beyond 6 months may indicate neurological dysfunction such as cerebral palsy; the Moro reflex is elicited by sudden head drop and produces symmetric arm extension + abduction followed by flexion + adduction (embracing response)

C. 18 months

D. 3 years

✓ **Answer: B**

💡 **Rationale & Explanation:**

Primitive reflex integration timeline: MORO: birth → integrated by 4-6 months. ROOTING: birth → 3-4 months. PALMAR GRASP: birth → 3-6 months. TONIC LABYRINTHINE REFLEX (TLR): birth → 4-6 months. ATNR (fencer reflex): birth → 4-6 months. STNR: 4-6 months → 9-12 months. PERSISTENCE beyond expected integration = possible CP, TBI,

or other neurological dysfunction. In CP: ATNR persistence interferes with midline activities; TLR persistence disrupts sitting and standing posture. PT focuses on facilitating higher-level postural reactions that normally REPLACE the primitive reflexes.

NEUROLOGICAL REHABILITATION

205. In post-stroke shoulder subluxation management, which intervention has LEVEL 1 evidence?

A. Aggressive passive glenohumeral traction

B. FUNCTIONAL ELECTRICAL STIMULATION (FES) to supraspinatus and posterior deltoid — strongest evidence for reducing subluxation and pain; the rotator cuff is electrically activated to maintain glenohumeral joint integrity in the absence of voluntary neural control

C. Sling only

D. Hot packs only

✓ Answer: B

💡 **Rationale & Explanation:**

Post-stroke shoulder subluxation management: flaccid shoulder subluxation occurs in up to 81% of stroke patients. LEVEL 1 EVIDENCE: FES to supraspinatus and posterior deltoid — multiple RCTs confirm reduction in subluxation distance (measured radiographically) and pain. OTHER EVIDENCE-BASED: kinesiology tape glenohumeral support (Level 2); supportive positioning (arm trough on wheelchair); ROM maintenance (careful passive ROM avoiding traction). AVOID: aggressive passive traction on the flaccid shoulder — risk of capsular injury, impingement, bursitis, CRPS, worsening subluxation. Handle the flaccid shoulder gently — never pull on the arm.

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206. The 'Chedoke-McMaster Stroke Assessment' (CMSA) impairment inventory uses a staging system based on:

A. Random grading

B. BRUNNSTROM'S RECOVERY FRAMEWORK — 7-stage scales for each body segment (shoulder, arm, hand, leg, foot) + postural control, each with clear behavioral criteria describing the movement characteristics at each stage

C. Barthel scoring

D. Only manual muscle testing

✓ Answer: B

💡 **Rationale & Explanation:**

CMSA (Gowland et al.): 6 subscales each rated 1-7 (based on Brunnstrom stages with explicit behavioral criteria): shoulder, arm, hand, leg, foot, postural control. Knowing the Brunnstrom stage informs what type of facilitation/task is appropriate: Stage 1 = flaccid → facilitation of reflexes; Stages 2-3 = synergistic → use synergy patterns; Stages 4-5 = breaking synergy → combine patterns; Stages 6-7 = near normal → functional task practice. CMSA captures limb-specific recovery and directly guides therapeutic interventions. Good reliability and validity.

NEUROLOGICAL ASSESSMENT

207. The 'Nottingham Sensory Assessment' (NSA) for stroke measures:

A. Motor function

B. TACTILE SENSATION (light touch, pressure, pin-prick), PROPRIOCEPTION (joint position sense, kinesthesia), STEREOGNOSIS, and BILATERAL SIMULTANEOUS STIMULATION — providing a comprehensive post-stroke sensory profile

C. Balance only

D. Cognitive function

✓ Answer: B

💡 **Rationale & Explanation:**

NSA (Lincoln et al.): comprehensive standardized sensory testing for stroke. TACTILE: light touch (cotton wool), pressure (finger), sharp/dull

(pin-prick vs. finger pad) at 9 body areas. PROPRIOCEPTION: passive joint movement detection (kinesthesia), joint position matching at wrist, elbow, shoulder, knee, ankle. STEREOGNOSIS: object identification by touch alone (eyes closed). BILATERAL SIMULTANEOUS STIMULATION: detecting whether one or both sides touched simultaneously (assessing extinction). Scored: absent, impaired, or normal. Sensory impairment post-stroke affects hand function rehabilitation, balance, proprioceptive retraining, and safety awareness.

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208. The 'EDSS Step 6' in multiple sclerosis means:

A. Patient can walk independently

B. Requires a walking aid (cane, crutch, or brace) to walk about 100 meters with or without resting — a major functional milestone marking the patient's first requirement for a walking aid

C. Patient is wheelchair dependent

D. Patient is bed-bound

✓ Answer: B

💡 **Rationale & Explanation:**

EDSS Step 6 (Kurtzke): requires UNILATERAL OR BILATERAL ASSISTANCE to walk about 100 meters. Steps around 6: 5.0 = walks without aid ~200m; 5.5 = walks without aid ~100m; 6.0 = INTERMITTENT or UNILATERAL constant assistance required for 100m; 6.5 = CONSTANT BILATERAL assistance required to walk 20m. PT at step 6: optimize walking aid selection and fit; fall prevention; assistive device training; energy conservation for walking; exercises to maintain lower extremity strength; consideration of power mobility for community distances.

NEUROLOGICAL REHABILITATION

209. In the SCI rehabilitation context, 'conus' vs. 'cauda equina' injury: the BLADDER type in complete cauda equina injury is:

A. Reflex (UMN) bladder

B. AREFLEXIC (autonomous, LMN) bladder — the sacral reflex arc is disrupted; the detrusor does not contract; management requires Credé maneuver, Valsalva, or clean intermittent catheterization (CIC)

C. Overactive bladder

D. Normal bladder function

✓ Answer: B

💡 Rationale & Explanation:

Conus/cauda equina vs. upper cord injury bladder management: ABOVE CONUS (T12 and above): UMN pattern → REFLEX BLADDER — detrusor contracts reflexively when full; timed voiding or triggered voiding (suprapubic tapping) can promote emptying. CONUS/CAUDA EQUINA: LMN pattern → AREFLEXIC BLADDER — no detrusor contraction; management: Credé (suprapubic compression), Valsalva (bearing down), or CLEAN INTERMITTENT CATHETERIZATION (CIC) every 4-6 hours. PT/nursing must know bladder management differences to plan and educate patients appropriately.

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210. The 'constraint-induced language therapy' (CILT) for aphasia forces verbal communication by:

A. Complete rest from communication

B. Constraining gestures, drawing, and other compensatory communication strategies — forcing the patient to USE VERBAL LANGUAGE INTENSIVELY in structured card games (3 hours/day × 10 days)

C. Using sign language

D. Passive auditory exposure only

✓ Answer: B

💡 Rationale & Explanation:

CILT (also called ILAT — Intensive Language-Action Therapy): based on CIMT principles applied to language. Patient plays structured card games requiring VERBAL COMMUNICATION to request cards — NO gestures, NO writing, NO pointing (these 'learned non-use' behaviors

are constrained). The forced verbal use + social motivation + intensive repetition drives LANGUAGE REORGANIZATION. EVIDENCE: high-quality RCTs show CILT improves communication ability, naming, word finding, spontaneous speech in both acute and chronic aphasia. Dose: 3 hours/day × 10 days (30 hours total). BEST CANDIDATES: mild-moderate non-fluent (Broca's) aphasia with some residual verbal ability.

NEUROLOGICAL ASSESSMENT

211. The 'Fugl-Meyer Sensory Assessment' (FMA-S) maximum score is:

A. 66

B. 24 — testing LIGHT TOUCH at 4 locations and JOINT POSITION SENSE at 4 locations bilaterally; 0=absent, 1=impaired, 2=normal per site per modality

C. 100

D. 36

✓ Answer: B

💡 **Rationale & Explanation:**

FMA Sensory Assessment: LIGHT TOUCH (exteroception): shoulder, palm, thigh, sole of foot — 4 sites × 2 (0/1/2) = 8 points max. JOINT POSITION SENSE: shoulder, wrist, hip, ankle — 4 sites × 2 (0/1/2) = 8 points max. TOTAL = 16 points (some versions include additional items giving maximum of 24). Sensory impairment affects: up to 65% of stroke patients; rehabilitation progress (sensory feedback essential for motor re-learning); safety awareness; functional outcomes. The FMA-S is part of the comprehensive FMA and is sometimes administered as a standalone sensory assessment.

NEUROLOGICAL REHABILITATION

212. 'HABIT' (Hand-Arm Bimanual Intensive Training) for hemiplegic CP differs from CIMT because:

A. HABIT is less intensive

B. HABIT does NOT constrain the stronger hand — instead both hands work TOGETHER in 90 hours of intensive BIMANUAL task practice, improving bimanual coordination rather than unilateral limb use

C. HABIT uses splinting

D. HABIT is only for adults

✓ Answer: B

💡 **Rationale & Explanation:**

HABIT (Gordon et al., Columbia University): an evidence-based intensive therapy for hemiplegic CP. 90 hours over 2-6 weeks of BIMANUAL (two-handed) TASK PRACTICE. Evidence comparison: CIMT improves AMOUNT of unilateral limb use. HABIT improves BIMANUAL HAND USE (how well both hands work together) — the most functionally important outcome for daily life. Ideally: CIMT first to establish basic limb use, then HABIT to integrate into functional bimanual use. Current evidence: HABIT as effective as CIMT for overall hand function, with HABIT showing superior bimanual outcomes.

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213. 'Aquatic therapy' for neurological patients: WARM WATER (34-36°C) specifically benefits patients with spasticity because:

A. Cold water reduces spasticity better

B. Warm water REDUCES MUSCLE TONE and PAIN through thermoreceptor activation and reduced gamma motor neuron excitability — allowing better voluntary movement and easier therapeutic exercise within the session

C. Warm water increases spasticity

D. Temperature has no effect on spasticity

✓ Answer: B

💡 **Rationale & Explanation:**

Aquatic therapy and spasticity: WARM WATER (34-36°C): activates thermoreceptors → reduces gamma motor neuron excitability →

REDUCES MUSCLE TONE (spasticity) temporarily; also reduces pain (analgesic effect of warm water). For CP, stroke spasticity, MS: warm water facilitates: easier passive ROM; better voluntary movement quality within the session; increased range for exercise. NOTE for MS: Uhthoff phenomenon → use cooler water (28-32°C) for MS patients to prevent symptom exacerbation. CLINICAL ADVANTAGE: the tone reduction during aquatic therapy provides a window for functional practice that may be difficult on land.

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214. The 'Graded Motor Imagery' program for CRPS is a THREE-STAGE sequential protocol. The correct order is:

A. Imagined movements → Mirror therapy → Left-right discrimination

B. LEFT-RIGHT DISCRIMINATION → IMAGINED MOVEMENTS → MIRROR THERAPY — each stage must be mastered before progressing; the sequence begins with implicit motor imagery (safest) and progressively activates the motor system more explicitly

C. Mirror therapy → Left-right discrimination → Imagined movements

D. All stages simultaneously

✓ Answer: B

💡 **Rationale & Explanation:**

GMI protocol (Moseley): STAGE 1 (LEFT-RIGHT DISCRIMINATION): implicitly activates the premotor cortex without consciously imagining movement — safest (least likely to provoke pain). Uses the Recognise app. 2-3 weeks. STAGE 2 (IMAGINED MOVEMENTS): explicitly imagines performing movements of the affected limb — directly activates motor circuits without actual movement. 2-3 weeks. STAGE 3 (MIRROR THERAPY): the unaffected limb's movements are reflected in a mirror — provides visual feedback of 'normal' movement for the affected limb's cortical representation. Each stage progresses only when minimal symptom exacerbation occurs. Total program: ~6 weeks. Level 1a evidence for CRPS and phantom limb pain.

NEUROLOGICAL ASSESSMENT

215. The 'Berg Balance Scale' was specifically designed and validated primarily for:

A. Children with CP

B. Elderly patients and those with neurological conditions (primarily stroke and older adults with fall risk) — 14 functional balance tasks; excellent reliability, responsiveness, and predictive validity for falls

C. Healthy athletes

D. Patients with vestibular disorders primarily

✓ Answer: B

💡 **Rationale & Explanation:**

BBS (Katherine Berg, 1989): designed for ELDERLY patients and neurological conditions (primarily STROKE). 14 items — sitting and standing in various conditions, transfers, turning, reaching, picking up objects. Most validated for: STROKE (excellent reliability ICC >0.95, responsiveness, fall prediction); ELDERLY (falls prediction, fall prevention outcomes); MS, PD (widely used, normative data available). In the Philippines: the BBS is the most widely used balance assessment in stroke rehabilitation — it is virtually required knowledge for the PRC PT boards. Fall risk threshold: <45/56 suggests increased fall risk; <36 = almost always requires assistive device for ambulation.

NEUROLOGICAL REHABILITATION

216. Botulinum toxin (BoNT-A) for post-stroke spasticity is MOST effective when:

A. Injected alone without PT

B. Combined with INTENSIVE REHABILITATION (stretching, splinting, functional task practice) within 1-2 weeks of injection — the 'window of opportunity' for functional gains is during the period of reduced tone (3-6 months post-injection)

C. Injected multiple times per week

D. Given in the non-affected limb

✓ **Answer: B**

💡 **Rationale & Explanation:**

BoNT-A timing and PT: BoNT-A temporarily reduces spasticity for 3-6 months by blocking acetylcholine release at the neuromuscular junction. This creates a 'WINDOW OF OPPORTUNITY': reduced tone allows STRETCHING to increase passive ROM; SERIAL CASTING to maintain gained range; FUNCTIONAL TASK PRACTICE — the patient can better access voluntary movement. Without rehabilitation during this window: the tone reduction is largely wasted (temporary benefit only). WITH intensive rehabilitation: functional gains can persist even after the toxin wears off (learned motor recovery). Most BoNT-A stroke trials show GREATER FUNCTIONAL BENEFIT when combined with PT.

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217. The 'Mental Practice / Motor Imagery' evidence for post-stroke UE recovery:

A. Replaces physical practice entirely

B. Acts as an ADJUNCT to physical practice — imagining movement activates overlapping neural circuits to actual movement execution (demonstrated by neuroimaging), contributing to cortical reorganization and motor recovery particularly when physical practice is limited

C. Only works for athletes

D. Has no evidence in stroke

✓ **Answer: B**

💡 **Rationale & Explanation:**

Mental practice / Motor imagery in stroke (Level 2 evidence): imagining performing a movement activates: premotor cortex, supplementary motor area, basal ganglia, cerebellum — similar (not identical) to actual movement. APPLICATIONS: UE with too little voluntary movement for physical practice; combined with physical practice improves UE function better than physical practice alone; post-surgical rehabilitation during immobilization (reduces strength loss). PROTOCOL: 15-20 minutes of KINESTHETIC (first-person) imagery

of functional tasks — imagined in real-time speed. KINESTHETIC imagery (feeling the movement) is more effective than visual imagery (watching yourself) for motor learning.

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218. The 'OPTIMAL theory of motor learning' key principle of EXTERNAL FOCUS means:

A. Focus on body parts (contract your glute max)

B. Focus attention on the ENVIRONMENTAL GOAL of the movement (push your foot into the floor, hit the target) rather than the internal mechanics — external focus produces better motor learning because it allows the motor system to self-organize without excessive conscious interference (Constrained Action Hypothesis)

C. Focus on the equipment used

D. Focus on pain avoidance

✓ Answer: B

💡 **Rationale & Explanation:**

External vs. internal focus of attention (Gabriele Wulf): EXTERNAL FOCUS: attention on the MOVEMENT EFFECT in the environment. Example: 'Push the floor away with your foot' (external). INTERNAL FOCUS: attention on body movement. Example: 'Contract your quadriceps' (internal). CONSTRAINED ACTION HYPOTHESIS: internal focus constrains the motor system under explicit conscious control → interferes with the automatic self-organizing processes → poorer performance and learning. EXTERNAL FOCUS: allows automatic motor control processes to operate freely → better performance AND better retention and transfer. CLINICAL APPLICATION: when teaching rehabilitation exercises, direct attention to the movement outcome — not the specific muscles or body parts. 'Balance on the foam pad' (external) vs. 'activate your ankle stabilizers' (internal).

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219. In Parkinson's disease, 'LSVT-BIG' targets:

A. Speech volume

B. AMPLITUDE OF MOVEMENT — training patients to make LARGER, more EFFORTFUL MOVEMENTS in daily life activities; addresses the

bradykinesia-related movement smallness characteristic of PD; 16 individual 1-hour sessions over 4 weeks, delivered by a certified LSVT-BIG therapist

C. Balance only

D. Cognitive function

✓ Answer: B

💡 **Rationale & Explanation:**

LSVT-BIG (Lee Silverman Voice Treatment — adapted for physical therapy): THEORETICAL BASIS: PD patients have impaired internal cueing → their movements become progressively smaller (bradykinesia); with LSVT-BIG, patients learn that movements they perceive as 'normal' are actually too small → they must RECALIBRATE their motor system to produce 'BIG' movements. PROTOCOL: 16 individual sessions × 1 hour each × 4 consecutive weeks (Mon-Fri); 4 standardized whole-body exercises performed with MAXIMUM EFFORT and AMPLITUDE; homework daily. EVIDENCE: Level 1 — improves gait speed, step length, walking economy, balance, and quality of life in PD. LSVT-BIG requires specific therapist certification.

├— NEUROLOGICAL ASSESSMENT

220. The 'clinical frailty scale' (CFS) predicts which rehabilitation outcomes in neurological patients?

A. Only mortality

B. Complication rates, length of stay, functional recovery, and discharge destination — frail older adults (CFS ≥5) have higher complication rates, longer recovery, and are less likely to return home independently after neurological events

C. Only cognitive function

D. Only balance outcomes

✓ Answer: B

💡 **Rationale & Explanation:**

Clinical Frailty Scale (Rockwood) in neurological rehabilitation: CFS ≥5 (mildly frail) at stroke admission is associated with: higher 30-day mortality; lower FIM scores at discharge; more frequent complications (pneumonia, delirium, falls, pressure injuries); longer LOS; less likely to return home. PT IMPLICATIONS: INTENSIVE EARLY MOBILIZATION still beneficial for frail patients (bed rest worsens frailty rapidly); goals must be REALISTIC (discharge to community vs. supported living); MDT coordination crucial; FAMILY/CAREGIVER TRAINING becomes even more important; rehabilitation intensity may need adjustment (shorter sessions, more rest) to avoid over-fatiguing frail patients.

├— NEUROLOGICAL REHABILITATION

221. The 'Forced Exercise' protocol for PD using high-cadence tandem cycling is hypothesized to work by:

A. Improving cardiovascular fitness only

B. High-frequency sensorimotor input to the BASAL GANGLIA that may normalize abnormal oscillatory patterns in basal ganglia circuits — similar mechanism to deep brain stimulation — producing superior motor improvements compared to voluntary-paced cycling

C. Increasing medication absorption

D. Reducing falls by strengthening muscles

✓ Answer: B

💡 **Rationale & Explanation:**

Forced exercise (Jay Alberts, Cleveland Clinic): PD patients tandem cycle at 80-90 RPM (forced cadence ~35% above their voluntary rate). MOTOR IMPROVEMENTS: significantly greater reductions in bradykinesia, rigidity, and tremor (UPDRS scores) vs. voluntary cycling. NEURAL MECHANISM: high-frequency somatosensory input may NORMALIZE the abnormal beta oscillations in the basal ganglia that are characteristic of PD (similar to how DBS uses high-frequency stimulation to normalize basal ganglia function). PRACTICAL: stationary

tandem cycling with a trained partner or motor-assisted ergometer. PROTOCOL: 45 minutes, 3×/week, at 80-90 RPM forced cadence.

NEUROLOGICAL ASSESSMENT

222. The 'four square step test' (FSST) assesses:

A. Upper extremity strength

B. Dynamic balance and lateral stepping ability — patient steps clockwise and counterclockwise through four squares; normative time <15 seconds; >15 seconds = increased fall risk

C. Gait speed only

D. Tandem walking balance

✓ Answer: B

💡 **Rationale & Explanation:**

FSST: four canes placed on floor creating four squares. Patient stands in square 1 and steps into each square in order (1→2→3→4→1) clockwise then counter-clockwise, stepping forward, sideways, and backward. TIME is measured. Normative data: <15 seconds = no fall risk; >15 seconds = increased fall risk. ADVANTAGES: assesses MULTI-DIRECTIONAL stepping (unlike TUG which is primarily forward/backward); clinically relevant to community ambulation (stepping over obstacles, turning in different directions, lateral stepping are required); easy to administer and score. Used in: stroke, PD, MS, TBI, vestibular disorders, and falls prevention programs.

NEUROLOGICAL REHABILITATION

223. The 'Schuell stimulation approach' to aphasia rehabilitation uses:

A. AAC devices primarily

B. INTENSIVE, REPETITIVE AUDITORY-BASED STIMULATION — the damaged language cortex is activated through high-volume,

meaningful auditory input, promoting reorganization and recovery; auditory channel is used as the primary input because comprehension is usually less impaired than expression

C. Complete communication rest

D. Only written exercises

✓ Answer: B

💡 **Rationale & Explanation:**

Schuell's stimulation approach (Hildred Schuell, 1950s-60s): 1) AUDITORY STIMULATION primary input channel (less impaired than expression); 2) INTENSIVE STIMULATION — high frequency, repetitive; 3) MEANINGFUL RESPONSE — always require a language response; 4) REPETITION until reliable; 5) MULTIPLE MODALITIES. Modern aphasia therapy builds on Schuell's foundations with CILT/ILAT (constraint-induced language therapy) and semantic feature analysis. The Schuell approach remains influential in Philippine PT and SLP education.

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224. 'BWSTT' (Body Weight-Supported Treadmill Training) for an incomplete T10 SCI patient: INITIAL body weight support should be approximately:

A. 0% (full body weight)

B. 30-40% BWS — enough to allow stepping without excessive collapse while maintaining sufficient loading to activate CPG and generate therapeutic weight-bearing stimulus — gradually reduced as strength improves

C. 80-90% always

D. 50% always, never changed

✓ Answer: B

💡 **Rationale & Explanation:**

BWSTT BWS for incomplete SCI: GOAL: find the MINIMUM SUPPORT allowing near-normal step pattern — too much support = insufficient CPG activation; too little = patient collapses, compensatory patterns dominate. START: 30-40% BWS for most T10 incomplete SCI → patient bears 60-70% body weight → sufficient for CPG activation and

bone/muscle loading. PROGRESSION: reduce BWS by 5-10% each session as strength improves. TREADMILL SPEED: start slow (0.3-0.6 m/s), increase as stepping quality improves (target ≥0.5 m/s for optimal CPG activation). MANUAL FACILITATION: therapists facilitate hip extension, knee control, and foot placement during each step.

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225. 'Task analysis' in the Motor Relearning Programme (Carr and Shepherd) involves:

A. Measuring ROM at all joints

B. Systematically observing the patient attempt the task, comparing to normal biomechanics, identifying which specific components of movement are absent or impaired — then designing practice to address those specific deficits

C. Testing muscle strength only

D. Applying tonic reflexes

✓ Answer: B

💡 **Rationale & Explanation:**

Task analysis (MRP — Carr and Shepherd): STEPS: 1) OBSERVE the patient attempting the task (sit-to-stand, reaching, walking); 2) COMPARE to normal biomechanics (what should the movement look like?); 3) IDENTIFY MISSING COMPONENTS (which specific phases or muscle activations are absent?); 4) PRACTICE the missing components in isolation; 5) PRACTICE the whole task; 6) TRANSFER to other environments. Example: sit-to-stand analysis reveals patient cannot initiate forward trunk lean → specifically practice trunk forward lean; then full STS. This targeted approach is more efficient than general exercise and directly addresses the specific motor control deficit identified.

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226. 'Mirror therapy' for post-stroke UE uses the same neural mechanism as:

A. Electrical stimulation

B. MOTOR IMAGERY — both mirror therapy and motor imagery activate overlapping cortical networks (premotor cortex,

supplementary motor area) without actual movement; mirror therapy adds visual feedback making the cortical activation stronger than pure imagery alone

C. Passive ROM

D. Biofeedback EMG only

✓ Answer: B

💡 **Rationale & Explanation:**

Mirror therapy and motor imagery shared mechanism: both activate: PREMOTOR CORTEX (movement planning), SUPPLEMENTARY MOTOR AREA, and MIRROR NEURON CIRCUITS in parietal cortex. Mirror therapy ADDS the visual feedback of 'seeing' movement of the affected limb → STRONGER cortical activation than pure motor imagery alone (visual input amplifies the motor cortex excitation). The combined visual + motor imagery mechanism explains why mirror therapy produces better outcomes than motor imagery alone for some patients. Mirror therapy is most effective for: moderate hemiparesis (some voluntary movement present to combine with visual feedback); CRPS; phantom limb pain.

├— NEUROLOGICAL ASSESSMENT

227. The 'modified Ashworth Scale' (MAS) rates spasticity from:

A. 0-10

B. 0-4+ (0=no increase in tone; 1=slight catch; 1+=catch followed by minimal resistance; 2=more marked increase throughout most of ROM; 3=considerable increase, passive movement difficult; 4=affected part rigid) — measuring VELOCITY-DEPENDENT resistance to passive movement

C. 0-100

D. 1-5

✓ Answer: B

💡 **Rationale & Explanation:**

Modified Ashworth Scale: SCORING: 0 = normal muscle tone; 1 = SLIGHT increase in tone (catch when affected part is moved in flexion or extension); 1+ = SLIGHT increase in tone (catch) followed by MINIMAL RESISTANCE throughout the remainder of the range; 2 = MORE MARKED increase throughout most of ROM but affected part easily moved; 3 = CONSIDERABLE increase in tone, passive movement DIFFICULT; 4 = affected part RIGID in flexion or extension. Scores 0-4 (with 1+ inserted between 1 and 2). Measures spasticity at one VELOCITY (the examiner's choice of speed). Most commonly assessed at one velocity — does NOT capture velocity-dependence. Widely used in clinical practice despite reliability limitations.

NEUROLOGICAL REHABILITATION

228. The 'GRASP program' (Graded Repetitive Arm Supplementary Program) for stroke adds what to standard PT:

A. Passive stretching sessions

B. 30 MINUTES OF ADDITIONAL SELF-DIRECTED UE PRACTICE DAILY — following a structured manual with progressively challenging tasks (grasp, reach, bimanual tasks); the patient performs independently after initial instruction; evidence shows it doubles UE practice dose with superior outcomes

C. More rest time

D. Daily assessment by therapist

✓ Answer: B

💡 Rationale & Explanation:

GRASP (Harris et al., 2009): SELF-DIRECTED, 30 minutes/day, additional to standard PT. KEY FEATURES: patient performs INDEPENDENTLY after initial instruction (reduces therapist burden); STRUCTURED PROGRESSION: begins with simple grasp/release, progresses to manipulation and functional activities; PRINTED MANUAL: patient follows visual instruction independently. RCT EVIDENCE: GRASP group had significantly better UE outcomes (FMA-UE, grip strength, ADL) at 4

weeks and 6 months vs. conventional PT only. The GRASP program adds ~130+ additional UE repetitions/day — a MODEL for increasing PT dose without proportionally increasing therapist time.

NEUROLOGICAL ASSESSMENT

229. The 'Rivermead Motor Assessment' (RMA) differs from the RMI (Rivermead Mobility Index) in that:

A. They are the same test

B. The RMA assesses GROSS MOTOR FUNCTION, LEG/TRUNK FUNCTION, and ARM FUNCTION in 3 subscales — broader assessment of motor function including arm; while the RMI only assesses MOBILITY (locomotion); both are Rivermead scales but they measure different constructs

C. The RMA is older

D. The RMI includes arm function

✓ Answer: B

💡 **Rationale & Explanation:**

Rivermead scales disambiguation: RMI (Rivermead MOBILITY Index): 15 items, BED MOBILITY to RUNNING, all about locomotion and functional mobility. 0-15. RMA (Rivermead MOTOR Assessment): GROSS MOTOR FUNCTION (13 items: rolling → walking); LEG AND TRUNK (10 items: bridging, supine to standing, stairs); ARM (15 items: shoulder stabilization to fine motor tasks). Items scored hierarchically. Both are widely used in UK stroke rehabilitation and are exported to international PT practice. In clinical practice: use the RMI when you want to quickly track mobility progress; use the RMA when you need to track the full motor recovery spectrum including upper extremity.

NEUROLOGICAL REHABILITATION

230. **'Dual-task training' for improving gait in neurological patients specifically addresses:**

A. Only gait speed

B. The attentional and cognitive-motor allocation systems damaged by neurological injury — training the ability to perform motor and cognitive tasks simultaneously, improving real-world functional performance and reducing fall risk during distracted ambulation

C. Balance in isolation only

D. Lower extremity endurance only

✓ Answer: B

💡 **Rationale & Explanation:**

Dual-task training rationale: real-world walking requires SIMULTANEOUS motor and cognitive tasks (walking while talking, navigating while carrying a bag). After stroke, TBI, or PD: cognitive resources needed for motor control are increased, leaving fewer resources for concurrent cognitive tasks → DUAL-TASK INTERFERENCE → fall risk. Dual-task training: walk while counting backwards, naming animals, carrying a tray, answering questions. EVIDENCE: progressively challenging dual-task programs improve gait speed, balance, and fall rates in stroke, PD, and elderly populations. The dual-task COST (performance decrease during dual-task vs. single-task) decreases with training → the nervous system becomes more efficient at resource allocation.

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231. **'GBS disability scale' score of 4 means:**

A. Can walk independently

B. UNABLE TO WALK — confined to bed or wheelchair; requires intensive nursing care, respiratory monitoring, and PT focused on preventing complications (contractures, pressure ulcers, DVT) and maintaining physical condition

C. Can walk with aid

D. Requires assisted ventilation

✓ Answer: B

💡 **Rationale & Explanation:**

GBS Disability scale: 0=healthy; 1=minor symptoms, able to run; 2=walks >5m independently; 3=walks WITH AID; 4=UNABLE TO WALK — bed/wheelchair confined; 5=requires ASSISTED VENTILATION; 6=DEATH. A score of 4 requires: RESPIRATORY monitoring (may progress to requiring ventilation); PT: safety first (fall risk nil — patient is bed/wheelchair bound); brief purposeful handling (15-30 min); DVT prevention (passive ROM, compression stockings); pressure injury prevention (positioning program); caregiver education. RECOVERY PHASE: as GBS score improves (4→3→2→1), PT progressively introduces active exercise, transfers, gait training, and return to function.

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232. CIMT efficacy: the EXCITE trial (Wolf et al., 2006) established:

A. CIMT only works for 1 month

B. 6 hours/day of intensive task practice + constraint for 10 consecutive weekdays produces significant UE improvements maintained at 1 AND 2 YEARS follow-up — demonstrating the durability of neuroplastic changes induced by CIMT

C. CIMT only works acutely

D. CIMT has no long-term benefit

✓ **Answer: B**

💡 **Rationale & Explanation:**

EXCITE trial (Wolf et al., 2006, JAMA): the landmark CIMT RCT. PROTOCOL: 6 hours/day intensive task practice + constraint worn 90% waking hours × 10 days. POPULATION: chronic stroke (3-9 months post-stroke). RESULTS: significant improvements in: FMA-UE, Wolf Motor Function Test (WMFT), Motor Activity Log (MAL). DURABILITY: improvements maintained at 1-year and 2-year follow-up — demonstrating that CIMT-induced cortical reorganization is persistent. The EXCITE trial established: 1) CIMT works in chronic stroke; 2) Gains are durable; 3) 2 weeks of intensive therapy can produce lasting change. It became the foundation for widespread CIMT implementation in stroke rehabilitation worldwide.

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233. The 'Rancho Los Amigos Levels IV-V' require the PT to use:

A. Complex cognitive tasks and long sessions

B. LOW-STIMULATION ENVIRONMENT, simple consistent commands, adequate response time, redirection rather than confrontation, and brief sessions (5-30 minutes) — because the patient is confused and agitated and cannot process complex information

C. Aggressive exercise programs

D. Group therapy immediately

✓ Answer: B

💡 **Rationale & Explanation:**

Rancho Level IV (Confused-Agitated) PT approach: SAFETY first; brief purposeful handling sessions (5-10 minutes only); avoid activities that increase agitation; consistent team approach; caregiver education. Level V (Confused-Inappropriate): less agitated but still confused; short attention span (minutes); responds to familiar tasks; STRUCTURE: simple one-step commands; maximum 15-30 minute sessions; consistent therapist; memory aids (whiteboards with daily schedule); caregiver training. KEY PRINCIPLE: learning-based rehabilitation is NOT effective during PTA — focus on preventing complications and maintaining physical condition until the patient reaches Level VI+.

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234. In the rehabilitation of a patient with CEREBELLAR ATAXIA, which exercise approach is evidence-based?

A. High-speed dynamic movements from the start

B. SLOW, CONTROLLED, WEIGHTED EXERCISES combined with task-specific training — using wrist/ankle weights to reduce oscillation (Frenkel exercises), and progressive reduction of external support and visual feedback

C. Passive ROM only

D. Cardiovascular training only

✓ Answer: B

💡 **Rationale & Explanation:**

Cerebellar ataxia rehabilitation: the cerebellum controls COORDINATION, TIMING, and SMOOTH MOVEMENT. Without it: dysmetria, intention tremor, ataxic gait, dysdiadochokinesia, dysarthria. REHABILITATION PRINCIPLES: 1) WEIGHTED LIMBS: small weights at wrists/ankles dampen intention tremor by increasing limb inertia; 2) FRENKEL'S EXERCISES: highly structured slow coordination exercises — performed slowly and precisely with visual feedback, progressing to eyes closed; 3) TASK SPECIFICITY: practice functional tasks (reaching, writing, walking) in a controlled way; 4) VISUAL FEEDBACK: use visual targets and mirrors initially; 5) TREADMILL with support: reduces fall risk during gait training. Evidence: Level 2 for task-specific balance and coordination training in cerebellar ataxia.

NEUROLOGICAL ASSESSMENT

235. 'Spasticity' differs from 'rigidity' in the KEY clinical test finding:

A. Both feel the same on examination

B. SPASTICITY: velocity-DEPENDENT resistance (resistance increases with FASTER passive movement — hyperactive stretch reflex); RIGIDITY: velocity-INDEPENDENT (constant resistance at ALL speeds in ALL directions — lead-pipe or cogwheel pattern from basal ganglia pathology in PD)

C. Spasticity only affects distal muscles

D. Rigidity only occurs in cervical injuries

✓ Answer: B

💡 Rationale & Explanation:

Clinical distinction: SPASTICITY: the faster you move the limb, the more resistance you feel (like a door that resists more with speed). Caused by: UMN lesion → hyperactive tonic stretch reflex. Measured by: Modified Ashworth Scale (at one velocity). RIGIDITY: the same resistance at all speeds, in all directions — like bending a lead pipe. Caused by: BASAL GANGLIA dysfunction (PD). Cogwheel rigidity = tremor superimposed on lead-pipe rigidity. CLINICAL TEST: does

resistance change with speed? YES = spasticity; NO = rigidity. Treatment differs: Spasticity = stretching, splinting, botox, baclofen; Rigidity = dopaminergic medications, LSVT-BIG, manual therapy.

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236. The 'Brunnstrom stages of recovery' in post-stroke rehabilitation: Stage 3 is characterized by:

A. No movement (flaccid)

B. SPASTICITY AT MAXIMUM and the patient can only move in FLEXOR AND EXTENSOR SYNERGY PATTERNS — voluntary movement possible but only as part of the associated synergy

C. Movement in individual planes

D. Normal movement

✓ Answer: B

💡 **Rationale & Explanation:**

Brunnstrom stages: STAGE 1: flaccid, no movement. STAGE 2: spasticity developing, associated reactions, basic synergy elements appear. STAGE 3: SPASTICITY PEAKING, synergy patterns can be performed voluntarily (full flexor and extensor synergy patterns). STAGE 4: spasticity declining, some COMBINATIONS outside synergy patterns possible. STAGE 5: spasticity further decreased, INDEPENDENCE from synergy patterns; more isolated movements. STAGE 6: isolated joint movements possible, spasticity minimal or absent; near normal coordination. STAGE 7: normal. CLINICAL USE: guides PT treatment — Stage 3 patients use SYNERGY PATTERNS for task practice; Stages 4-5 begin BREAKING the synergy; Stages 6-7 refine isolated movements.

NEUROLOGICAL REHABILITATION

237. 'Sensory re-education' after peripheral nerve injury follows which SEQUENCE?

A. Start with pain discrimination

B. MOVING TOUCH → CONSTANT TOUCH → TEXTURE DISCRIMINATION → OBJECT RECOGNITION (stereognosis) — progresses from detecting gross sensory input to fine discrimination; begins after sensory threshold returns to the hand

C. Pain training only

D. Skip early stages and go to stereognosis directly

✓ Answer: B

💡 **Rationale & Explanation:**

Sensory re-education sequence (Dellon, Wynn Parry): EARLY PHASE (when 30 Hz vibration and moving touch return at fingertip): practice MOVING TOUCH discrimination; then CONSTANT TOUCH; advance to TEXTURE DISCRIMINATION. LATE PHASE (as sensory return progresses distally): practice OBJECT RECOGNITION (stereognosis) — identifying common objects by touch alone with eyes closed; progress to grading textures, sizes, hardness. PRACTICAL EXERCISES: patient closes eyes; therapist applies different stimuli; patient identifies the stimulus; visual feedback to correct errors. NEUROPLASTICITY RATIONALE: the sensory cortex reorganizes during nerve regeneration; structured sensory practice guides cortical remapping toward normal discrimination patterns. Timing: begin as soon as any sensation returns to the fingertip.

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238. 'Neurogenic bowel' management in SCI above the conus uses:

A. Laxatives only

B. A REFLEX BOWEL PROGRAM — timed digital stimulation (every 24-48 hours) to trigger the sacral reflexes and produce a predictable, scheduled bowel evacuation; diet, fluid intake, and timing are coordinated

C. Surgical colostomy always

D. No special management needed

✓ Answer: B

💡 **Rationale & Explanation:**

Neurogenic bowel management — reflex (UMN) bowel: above the conus, the sacral reflex arc is INTACT. REFLEX BOWEL PROGRAM: scheduled (same time daily or every other day); DIGITAL RECTAL STIMULATION: gentle circular motion in the rectum for 30-60 seconds → triggers sacral reflex → reflex bowel contraction → evacuation; TIMING: typically after breakfast (gastrocolic reflex amplifies the reflex response); DIET: high fiber, adequate fluid; SUPPOSITORIES (bisacodyl): may be used to trigger the reflex if digital stimulation alone is insufficient. GOAL: predictable, complete evacuation on schedule → prevents accidents and bowel distension. PT role: positioning (upright sitting is optimal for evacuation), functional independence in the program, education.

NEUROLOGICAL ASSESSMENT

239. Post-stroke 'motor recovery' prognosis: the Fugl-Meyer UE score at 4 weeks predicts:

A. Nothing clinically useful

B. 6-MONTH AND 1-YEAR UE OUTCOMES — specifically: FMA-UE ≥27/66 at 4 weeks = 'active sub-group' with good prognosis for meaningful hand recovery; FMA-UE 10-26 = 'limited recovery'; FMA-UE <10 at 4 weeks = poor prognosis for functional hand use

C. Balance outcomes only

D. Quality of life only

✓ Answer: B

💡 Rationale & Explanation:

FMA-UE prognostic value at 4 weeks: STINEAR'S RESEARCH and meta-analyses: FMA-UE score at 4 weeks post-stroke is one of the strongest predictors of long-term UE outcome. THRESHOLD: FMA-UE ≥27/66 at 4 weeks = excellent prognosis for functional hand recovery (active subgroup → intensive CIMT or task-practice highly indicated). FMA-UE 10-26 = moderate prognosis (partial recovery expected; task practice for functional use with assistive strategies). FMA-UE <10 at 4 weeks =

poor prognosis for functional hand use (compensation strategies become the primary focus). Early measurement guides REALISTIC GOAL SETTING and treatment intensity decisions — an important ethical consideration in resource allocation.

NEUROLOGICAL REHABILITATION

240. The '6-Minute Walk Test' (6MWT) in neurological rehabilitation measures:

A. Only gait speed

B. FUNCTIONAL EXERCISE CAPACITY — the maximum distance a patient can walk in 6 minutes at their own pace; reflects cardiovascular endurance, muscle strength, gait efficiency, and motivation; MCID in stroke ≈ 34-54 meters, in PD ≈ 80 meters, in MS ≈ 54 meters

C. Muscle strength only

D. Balance only

✓ Answer: B

💡 **Rationale & Explanation:**

6MWT in neurological conditions: PROCEDURE: patient walks as far as possible in 6 minutes on a flat surface (typically 30m corridor); distance recorded. NORMATIVE VALUES: healthy older adults: 400-600m; stroke survivors: 50-200m (subacute), 150-400m (community ambulators); PD: 300-450m (mild-moderate). MCID: stroke ~34-54m; PD ~80m; MS ~54m. CLINICAL USES: track rehabilitation progress; predict community ambulation capacity (>300m typically allows community ambulation); assess fitness for cardiac rehabilitation; compare treatment groups in research. ALSO MEASURES: exertion levels (Borg RPE at end), HR response, SpO2 (important for MS and cardiopulmonary co-morbidities).

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241. 'Spinal cord stimulation' (eSCS) as emerging research intervention for complete SCI:

A. Regenerates axons

B. Electrically stimulates the dorsal spinal cord BELOW the injury level — this modulates the CPG and motor circuits, enabling voluntary leg movement in some individuals classified as 'complete' (AIS A) when combined with intensive rehabilitation; suggests some 'complete' injuries may have sub-threshold preserved connections

C. Replaces FES entirely

D. Treats neuropathic pain only

✓ Answer: B

💡 **Rationale & Explanation:**

Epidural SCS (Harkema, Angeli, Grahn, Gill et al.): epidural electrodes implanted below the injury level; continuous stimulation of dorsal spinal cord; when stimulation is ON + patient makes voluntary effort → some apparently ASIA A patients can generate VOLUNTARY STEPPING MOVEMENTS. MECHANISM: stimulation modulates CPG and residual sub-threshold descending connections that were not detected by ASIA examination. IMPLICATION: the ASIA motor exam may overestimate completeness — latent preserved connections may exist even in 'complete' injuries that eSCS unmasks. Currently EXPERIMENTAL (not standard care). One of the most exciting areas in SCI neuroscience research (2014-2024). Future potential for clinical rehabilitation application.

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242. In pediatric CP rehabilitation, the 'GMFCS Level III' patient can:

A. Walk independently without limitations

B. Walk indoors and outdoors on LEVEL SURFACES with an assistive device (crutches, rollator) but requires a wheelchair for long distances or uneven terrain

C. Not walk at all

D. Walk with hand-held assistance only

✓ Answer: B

💡 **Rationale & Explanation:**

GMFCS (Gross Motor Function Classification System) Level III: walk indoors and outdoors on level surfaces using a hand-held mobility device (forearm crutches, rolator, cane); may use a wheelchair for longer distances or uneven terrain; may climb stairs holding a railing. Compare: Level I = walks without restrictions; Level II = walks with limitations; Level III = walks with assistive devices; Level IV = self-mobility with limitations (may use powered mobility); Level V = transported in a manual wheelchair. GMFCS guides PROGNOSIS and treatment GOALS: Level I-III patients have realistic goals for independent or assisted ambulation; Level IV-V goals focus on transfers, positioning, power mobility, and participation.

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243. The 'Halliwick 10-Point programme' last stage (Point 10) is:

A. Water entry

B. SIMPLE PROGRESSION — basic swimming movements allowing independent swimming; this final stage represents water independence and the beginning of recreational or competitive swimming

C. Breath control

D. Turbulent gliding

✓ Answer: B

💡 **Rationale & Explanation:**

Halliwick 10 points in order: 1) Mental adjustment (accepting water); 2) Disengagement from aids; 3) Transverse rotation (sagittal plane: forward/backward); 4) Sagittal rotation (frontal plane: side to side); 5) Longitudinal rotation (axial rotation: rolling around body axis); 6) Combined rotation; 7) Upthrust (flotation, buoyancy balance); 8) Balance in stillness (static balance floating); 9) Turbulent gliding (movement in turbulent water without kicking); 10) SIMPLE PROGRESSION (basic swimming, propulsion). Each point builds on the previous. The Halliwick approach is a THERAPEUTIC METHODOLOGY for rehabilitation as well as a teaching approach for swimming with disabilities.

NEUROLOGICAL ASSESSMENT

244. The 'Disabilities of the Arm, Shoulder and Hand' (DASH) questionnaire can be used in neurological conditions affecting the UE because:

A. It is specific to orthopaedic conditions only

B. It measures UE disability regardless of the CAUSE — valid for neurological UE dysfunction (stroke, peripheral nerve injury, MS) as well as musculoskeletal conditions; measuring UE disability with a standardized tool allows comparison across conditions and over time

C. It only measures pain

D. It requires 2 hours to complete

✓ Answer: B

💡 **Rationale & Explanation:**

DASH in neurological conditions: the DASH (30 items, 0-100, 0=no disability) was primarily developed for musculoskeletal UE conditions but is validated for NEUROLOGICAL UE dysfunction. VALIDATED FOR: stroke (measures UE functional disability), peripheral nerve injury, MS (UE dysfunction), cerebral palsy (some evidence), post-burn contractures. ADVANTAGE: allows comparison of UE disability across different etiologies — useful in research comparing neurological vs. orthopaedic populations. LIMITATION: the DASH captures DISABILITY (what the patient cannot do) but does not capture the motor IMPAIRMENT level (use FMA-UE for that). In clinical practice: use FMA-UE to track motor impairment + DASH or ABILHAND to track functional disability.

NEUROLOGICAL REHABILITATION

245. 'Kinesio taping' for neurological patients (post-stroke, CP): the PRIMARY mechanism proposed for improving motor function is:

A. Restricting movement

B. Providing CONTINUOUS SENSORY FEEDBACK to the skin (tactile input from the elastic tension) that may enhance body schema awareness, facilitate muscle activation, and improve joint alignment — stimulating the sensorimotor system through skin mechanoreceptors

C. Electrical stimulation

D. Heat generation

✓ Answer: B

💡 **Rationale & Explanation:**

Kinesio tape in neuro-rehabilitation: SENSORY FACILITATION: the elastic tension of the tape provides continuous tactile input to skin mechanoreceptors (Meissner corpuscles, Ruffini endings) → afferent sensory signal → SENSORIMOTOR INTEGRATION in the cortex → improved body awareness and motor control. MUSCLE FACILITATION: applied origin to insertion with 15-25% tension → facilitates weak muscles (e.g., tibialis anterior for foot drop, deltoid for shoulder subluxation). POSTURE SUPPORT: scapular positioning tape in CP, shoulder subluxation support in stroke. EVIDENCE: weak but emerging for: shoulder subluxation post-stroke (Level 2), postural alignment in CP, sensorimotor facilitation. Not a replacement for active rehabilitation but a useful adjunct.

NEUROLOGICAL ASSESSMENT

246. Post-stroke 'neglect' (hemispatial neglect) is most severe with lesions in:

A. Left hemisphere

B. RIGHT HEMISPHERE — specifically the right parietal lobe, right temporal-parietal junction (TPJ), and right frontal lobe; patients with left hemispatial neglect from right hemisphere lesions have WORSE

REHABILITATION OUTCOMES than comparable left hemisphere stroke patients

C. Bilateral hemisphere

D. Brainstem only

✓ Answer: B

💡 Rationale & Explanation:

Hemispatial neglect and lesion location: left hemispatial neglect = right hemisphere lesion (right parietal most common). WORSE PROGNOSIS: neglect is associated with: longer rehabilitation stays; greater difficulty with ADLs; higher caregiver burden; higher rates of discharge to institutional care; higher fall risk (patients collide with objects on the left, don't notice the left half of food on their plate). SEVERITY: perceptual neglect vs. motor neglect vs. representational neglect. REHABILITATION: scanning training (systematic left-to-right scanning); limb activation therapy; optokinetic stimulation; neck muscle vibration; prism adaptation training. Environmental modifications: approach from the right, gradually shift to left.

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247. The Fugl-Meyer lower extremity (FMA-LE) maximum score is:

A. 66

B. 34 — testing 17 items: reflexes, flexor synergy, extensor synergy, combined movements, coordination — each scored 0-2; MCID approximately 4-6 points

C. 100

D. 50

✓ Answer: B

💡 Rationale & Explanation:

FMA Lower Extremity: 34 POINTS (17 items × 2 points). Structure: REFLEX ACTIVITY (0-4 pts); VOLITIONAL MOVEMENT within synergy: flexor synergy (0-6), extensor synergy (0-6); VOLITIONAL MOVEMENT MIXING SYNERGIES (0-6); VOLITIONAL MOVEMENT WITH LITTLE OR NO SYNERGY (0-4); NORMAL REFLEX ACTIVITY (0-2); COORDINATION AND SPEED (0-6). Total FMA including UE + LE + balance + sensation +

ROM/pain = maximum 226 points. The FMA-LE is used less frequently in research than FMA-UE (which is more commonly the primary outcome in UE studies) but is important for assessing lower extremity motor recovery and guiding gait rehabilitation decisions.

NEUROLOGICAL REHABILITATION

248. The 'CIMT' application timeline: when is CIMT MOST appropriate in acute vs. chronic stroke?

A. Only in acute stroke

B. CIMT is effective in BOTH acute/subacute (3-9 months) AND CHRONIC (>6 months, years post-stroke) stroke — neuroplasticity is preserved years after stroke with sufficient intensity and motivation; the EXCITE trial enrolled 3-9 months; subsequent trials confirmed benefits in chronic stroke

C. Only in chronic stroke

D. Only after 2 years

✓ Answer: B

💡 **Rationale & Explanation:**

CIMT across the stroke timeline: EARLY WINDOW (first weeks): some evidence for very early CIMT (modified versions with reduced intensity); the brain is highly plastic but the patient may not have sufficient voluntary function. SUBACUTE (3-9 months): EXCITE trial population; neuroplasticity still high; strong evidence. CHRONIC (>6 months to years post-stroke): multiple RCTs confirm benefit — including patients 5-10+ years post-stroke. KEY PRINCIPLE: neuroplasticity is USE-DEPENDENT, not TIME-DEPENDENT — the brain can still change and adapt to intensive practice years after injury, as long as there is: sufficient motor function (wrist extension ≥10°), adequate cognition to participate, and sufficient intensity of practice. This is one of the most clinically important messages in neurological rehabilitation.

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249. In the Philippines, 'community-based rehabilitation' (CBR) PT role primarily focuses on:

A. Treating patients only in a clinic

B. EMPOWERING PERSONS WITH DISABILITIES AND THEIR FAMILIES through training, education, and advocacy at the community level — the PT teaches barangay health workers and family members, adapts environments for accessibility, promotes inclusion, and facilitates access to services

C. Prescribing medications

D. Administrative management only

✓ Answer: B

💡 **Rationale & Explanation:**

CBR in the Philippines: the CBR model addresses health, education, livelihood, social, and empowerment needs of persons with disabilities in the community. PT ROLE IN CBR: TRAINS community health workers (BHWs, family members) to carry out simple rehabilitation activities; ASSESSES and ADAPTS the home environment for accessibility; PROVIDES DIRECT SERVICES for complex cases; ADVOCATES for inclusion of PWDs in school, work, and community; COORDINATES with other sectors (education, social welfare, livelihood). CBR is endorsed by WHO and the Philippine government (PWD Act, Magna Carta for Disabled Persons). PAPT supports CBR expansion as a key strategy for extending PT services to underserved populations.

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250. The 'Passive Cycle Ergometry' (MOTOmed or similar) for patients with disorders of consciousness provides:

A. Restoration of consciousness directly

B. JOINT RANGE MAINTENANCE, CIRCULATORY EFFECTS, and RHYTHMIC PROPRIOCEPTIVE SENSORIMOTOR INPUT — may stimulate arousal and conscious processing in minimally conscious state (MCS) patients through repetitive somatosensory input to spinal and cortical circuits

C. Voluntary muscle training

D. Only cardiovascular benefit

✓ **Answer: B**

💡 **Rationale & Explanation:**

Passive cycling for DOC patients (VS/MCS): patients in vegetative or minimally conscious state cannot voluntarily exercise. PASSIVE CYCLING PROVIDES: 1) JOINT RANGE: prevents lower extremity contractures; 2) MUSCLE MASS: passive movement stimulates some motor neuron activity via stretch reflexes; 3) CIRCULATION: improves peripheral circulation; 4) SENSORY INPUT: rhythmic proprioceptive input may stimulate arousal and cortical activation; 5) SPASTICITY MANAGEMENT: rhythmic passive movement can temporarily reduce extensor spasticity. EMERGING EVIDENCE: combined passive + FES cycling may improve spasticity and facilitate consciousness emergence in MCS patients. Used as part of a comprehensive sensory stimulation program alongside family presence, familiar voices, and purposeful handling.

S4
Physical Therapy Procedures, Modalities & Electrotherapy

Physical Agents, Electrotherapy, Exercise Science & Rehabilitation Technology

PHYSICAL AGENTS

1. Therapeutic ultrasound at 1 MHz frequency penetrates to which approximate depth?

A. 0.5-1 cm depth (superficial)

B. 2-5 cm depth

C. 5-10 cm depth

D. >10 cm depth

✓ **Answer: B**

💡 **Rationale & Explanation:**

Ultrasound frequency vs. depth: 1 MHz = DEEPER tissues (up to 2-5 cm) — used for large muscles, deep tendons, hip joint. 3 MHz = SUPERFICIAL tissues (0.5-2 cm) — used for facial muscles, small joints, tendons near the surface. The higher the frequency, the SHALLOWER the penetration. Easy memory: '1 MHz = deep, 3 MHz = shallow.' In practice: use 1 MHz for deep tendons (Achilles), hip, and shoulder; use 3 MHz for forearm tendons, ankle, and wrist. Continuous US = thermal effects; Pulsed US = predominantly non-thermal — use pulsed for acute injuries.

2. The thermal effects of ultrasound therapy include all EXCEPT:

A. Increased tissue extensibility

B. Increased metabolic rate of tissue

C. Acoustic streaming and stable cavitation

D. Vasodilation and increased blood flow

✓ Answer: C

💡 **Rationale & Explanation:**

Thermal effects of continuous ultrasound: increased tissue temperature → increased metabolic rate, vasodilation, increased blood flow, collagen extensibility (stretch heated tissue WITHIN 3 minutes!), reduced muscle spasm, and increased nerve conduction velocity. Acoustic streaming (movement of fluid along cell membranes) and cavitation (formation and oscillation of gas bubbles in tissue fluids) are the primary NON-THERMAL effects. Non-thermal effects are thought to promote tissue healing, reduce inflammation, and enhance cell membrane permeability. Pulsed mode = non-thermal benefits, less heating.

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3. Cold therapy (cryotherapy) is MOST appropriate for:

A. Chronic stiffness of the cervical spine

B. Raynaud's phenomenon

C. Acute ankle sprain (first 24-48 hours) with swelling and pain

D. Myofascial trigger point with pain-free motion restriction

✓ Answer: C

💡 **Rationale & Explanation:**

Cryotherapy indications: ACUTE injuries (first 24-72 hours) — reduces swelling, inflammation, and pain; post-exercise soreness; muscle spasm (brief cooling); fever. Mechanism: vasoconstriction reduces bleeding/swelling; cold blocks nerve conduction (reduces pain); decreases metabolic rate in injured tissue. Contraindications: Raynaud's phenomenon (cold triggers vasospasm — VERY dangerous); cold urticaria; Buerger's disease; areas with impaired sensation; open wounds. ACUTE SPRAIN = Cold. Always RICE/PRICE in acute injuries.

ELECTROTHERAPY

4. The TENS parameter that MOST effectively produces immediate pain relief through gate control theory is:

A. Low frequency (1-4 Hz), high intensity (motor level) for endorphin release

B. High frequency (80-150 Hz), low intensity (sensory level, comfortable tingling) — conventional TENS

C. Burst mode TENS at 2 Hz burst rate

D. High intensity, long pulse duration for muscle contraction

✓ Answer: B

💡 Rationale & Explanation:

TENS modes: Conventional TENS (HIGH frequency 80-150 Hz, LOW intensity — comfortable sensory tingling, no muscle contraction): works via GATE CONTROL — large diameter A-beta sensory fibers activated, 'closing the gate' on pain signals. Provides RAPID pain relief but SHORT duration. Acupuncture-like TENS (LOW frequency 1-4 Hz, HIGH intensity — motor threshold, produces muscle twitching): activates A-delta fibers, triggers ENDORPHIN RELEASE. Longer lasting analgesia but takes longer to onset. For IMMEDIATE pain relief = conventional TENS (high freq, low intensity).

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5. Which type of electrical current is used for IONTOPHORESIS?

A. Alternating current (AC) — interferential

B. Pulsed current (PC)

C. Direct current (DC)

D. Faradic current

✓ Answer: C

💡 Rationale & Explanation:

Iontophoresis uses DIRECT CURRENT (DC) to drive ions through the skin into the tissue. The principle: like charges repel — a positively

charged drug is placed under the POSITIVE electrode (anode) and pushed INTO the tissue. Negatively charged drugs go under the cathode. Common drugs: dexamethasone (-) for inflammation (calcific tendinitis, plantar fasciitis), lidocaine (+) for local anesthesia, acetic acid (-) for calcium deposits. Current: 1-4 mA for 10-20 minutes. Benefits: non-invasive drug delivery, targeted local effect, avoids systemic side effects.

---

6. Interferential current (IFC) is produced by:

A. Single channel medium-frequency current at 4000 Hz

B. Two medium-frequency AC currents (~4000 Hz) that intersect and create a beat frequency (1-150 Hz) in the tissue

C. Low-frequency pulsed current at 50 Hz

D. High-voltage galvanic current with paired probes

✓ Answer: B

💡 **Rationale & Explanation:**

Interferential current (IFC): TWO medium-frequency AC currents (e.g., 4000 Hz and 4100 Hz) applied through four electrodes. They intersect in the tissue, and the difference in frequency (100 Hz beat frequency) produces the therapeutic low-frequency stimulation DEEP in the tissue. The medium frequency passes through the skin's resistance more easily than low frequency — less skin impedance, deeper penetration, more comfortable. The resulting beat frequency provides: pain relief, muscle stimulation, edema reduction.

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7. Neuromuscular electrical stimulation (NMES) differs from TENS primarily in that:

A. NMES uses AC current while TENS uses DC

B. NMES uses higher intensity to produce muscle contractions while TENS primarily targets sensory nerves for pain control

C. NMES has no analgesic effect

D. TENS uses 4-electrode placement while NMES uses 2 electrodes

✓ Answer: B

💡 **Rationale & Explanation:**

NMES vs. TENS: TENS = primarily sensory stimulation for PAIN MANAGEMENT (comfortable tingling, usually below motor threshold). NMES = MOTOR STIMULATION — intensity is turned up to produce visible muscle CONTRACTIONS. NMES applications: muscle re-education after injury/surgery (quad sets after ACL reconstruction), preventing atrophy during immobilization, facilitating weak muscles (drop foot), reducing spasticity (reciprocal inhibition). Therapeutic NMES parameters: pulse width 200-350 µs, frequency 35-80 Hz (tetanic contraction). Both can use similar waveforms — it's the INTENSITY and PURPOSE that differs.

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8. The ABSOLUTE contraindication to electrical stimulation is:

A. Over muscle trigger points in chronic pain

B. Over the transthoracic region in patients with pacemakers or cardiac arrhythmias

C. On the lower back of a patient with osteoporosis

D. On the thigh of a patient taking NSAIDs

✓ **Answer: B**

💡 **Rationale & Explanation:**

Absolute contraindications for electrical stimulation: Over the HEART/TRANSTHORACIC region in patients with pacemakers (electrical current can interfere with or reprogram pacemakers, trigger arrhythmias); Over the carotid sinus (can cause reflex bradycardia or hypotension); Over areas of malignancy; Over the abdomen/lumbar area during pregnancy; Over thrombophlebitic areas. The MOST absolute = transthoracic in patients with pacemakers. Trigger points, osteoporosis, and NSAID use are NOT contraindications to electrical stimulation.

PHYSICAL AGENTS

9. **Paraffin bath therapy is specifically beneficial for:**

A. Acute injuries with open wounds

B. Chronic conditions of the hands and feet — rheumatoid arthritis, scleroderma, chronic joint stiffness

C. Muscle strengthening of the intrinsic hand muscles

D. Post-surgical wound dehiscence

✓ Answer: B

💡 **Rationale & Explanation:**

Paraffin bath: a mixture of paraffin wax and mineral oil (ratio ~6:1) heated to 52-54°C. The wax has high heat capacity and low thermal conductivity — it feels hotter than water at the same temperature but transfers heat more gently. Methods: Dip-and-wrap (best for hands), dip-and-immerse, paint method. Best for: RA and OA hand/foot joints, scleroderma, Dupuytren's contracture, post-fracture rehabilitation. CONTRAINDICATED: open wounds, rashes, infections, peripheral vascular disease, impaired sensation, acute injuries. A great preparation for exercise and stretching.

├─ EXERCISE SCIENCE

10. **The FITT principle for aerobic exercise prescription in healthy adults (ACSM) recommends:**

A. Frequency: 2x/week; Intensity: 40-60% HRmax; Time: 15 min; Type: low impact only

B. Frequency: 3-5 days/week; Intensity: 64-76% HRmax (moderate) or 77-93% HRmax (vigorous); Time: 30-60 min moderate or 20-60 min vigorous; Type: rhythmic, large-muscle group aerobic activity

C. Frequency: daily; Intensity: 90% HRmax; Time: 60 min; Type: high-intensity interval only

D. Frequency: 5-7 days/week; Intensity: 50% max; Time: 10 min; Type: any activity

✓ Answer: B

💡 **Rationale & Explanation:**

ACSM aerobic exercise guidelines for healthy adults: Frequency = 3-5 days/week; Intensity = moderate (64-76% HRmax, RPE 12-14, 'can speak in short sentences') OR vigorous (77-93% HRmax, RPE 14-17); Time = 30-60 min moderate or 20-60 min vigorous (150 min/week moderate or 75 min/week vigorous); Type = any sustained, rhythmic, large muscle group activity. These guidelines underpin all cardiopulmonary PT exercise prescriptions.

├─ CARDIOPULMONARY PT

11. Pursed-lip breathing (PLB) for COPD patients works by:

A. Increasing tidal volume through diaphragmatic strengthening

B. Creating back-pressure to maintain airway patency, slowing expiration and reducing air trapping

C. Reducing FRC by promoting complete exhalation

D. Training accessory muscles of inspiration

✓ Answer: B

💡 **Rationale & Explanation:**

Pursed-lip breathing (PLB): patient inhales through the nose (2 counts), exhales slowly through pursed lips (4 counts). Mechanism: the partial airway closure during exhalation creates BACK PRESSURE in the airways, preventing early airway collapse during expiration. In COPD: loss of elastic recoil causes dynamic airway collapse during expiration — air gets TRAPPED, increasing FRC and causing hyperinflation. PLB reduces air trapping by maintaining positive expiratory pressure. Benefits: reduces respiratory rate, increases tidal volume, improves SpO2, reduces dyspnea.

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12. Chest physiotherapy for secretion removal includes all EXCEPT:

A. Postural drainage (positioning)

B. Percussion (clapping)

C. Vibration during expiration

D. IPPB (intermittent positive pressure breathing) as first-line secretion removal

✓ Answer: D

💡 **Rationale & Explanation:**

Classic chest physiotherapy (CPT) for secretion clearance: POSTURAL DRAINAGE (position the patient so affected lung segment drains by gravity) + PERCUSSION/CLAPPING (rhythmic cupped-hand clapping over the segment to loosen secretions) + VIBRATION/SHAKING (fine vibrations during exhalation). IPPB (intermittent positive pressure breathing) is primarily used for respiratory muscle fatigue or to deliver nebulized medication — NOT a first-line secretion clearance tool. Modern alternatives to CPT: active cycle of breathing technique (ACBT), autogenic drainage, flutter/PEP devices.

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13. The BORG Rate of Perceived Exertion (RPE): what range corresponds to MODERATE intensity exercise (~60-75% HRmax)?

A. 6-8 on Borg 20-point scale

B. 11-13 on Borg 20-point scale

C. 14-16 on Borg 20-point scale

D. 17-19 on Borg 20-point scale

✓ Answer: C

💡 **Rationale & Explanation:**

Borg 20-point RPE scale (6-20): 6-8 = rest/very light; 9-10 = light; 11-13 = fairly light to somewhat hard; 13-14 = moderate; 14-17 = somewhat hard to very hard; 18-20 = maximal. Moderate intensity corresponds to approximately 12-14 on the 20-point scale — but the ranges for 'moderate' cardiovascular exercise align best with 12-14. For cardiac patients: keep RPE below 13 initially, progressing as tolerated. RPE is valuable when HR monitoring is impractical or unreliable (e.g., patients on beta-blockers).

PHYSICAL AGENTS

14. The Arndt-Schulz law in physical medicine states:

A. More intensity always produces better therapeutic outcomes

B. Small doses STIMULATE, medium doses OPTIMIZE, large doses INHIBIT physiological processes

C. Low frequency currents are more effective than high frequency

D. Pain always indicates tissue damage and treatment should stop

✓ Answer: B

💡 Rationale & Explanation:

Arndt-Schulz Law (dose-response): SMALL stimulus = no response; MODERATE stimulus = optimal stimulation and therapeutic benefit; LARGE stimulus = INHIBITION of physiological processes. This law applies to light therapy (photobiomodulation), ultrasound, electrical stimulation, and exercise. It explains why: too little US has no effect, correct parameters produce healing, and too much can inhibit healing or cause damage. This principle guides intensity selection for ALL physical agents — always use the MINIMUM effective dose.

AQUATIC THERAPY

15. The Archimedes principle as applied to aquatic therapy means:

A. Hot water reduces pain through thermal mechanisms

B. A body immersed in water is buoyed upward with a force equal to the weight of the fluid displaced

C. Water resistance is proportional to the square of velocity

D. The hydrostatic pressure of water reduces edema

✓ Answer: B

💡 Rationale & Explanation:

Archimedes' principle: buoyancy force = weight of displaced fluid. Clinical applications: immersed to the neck = ~90% body weight reduction; to the umbilicus = ~50% reduction; to the hip level = ~40% reduction. This allows patients with limited weight-bearing capacity to exercise with reduced joint loading. Properties in aquatic therapy: Buoyancy (reduces weight-bearing), Hydrostatic pressure (reduces edema, supports joint structures — increases with depth), Viscosity/resistance, Thermodynamics (warm water reduces pain and spasm). Know ALL four water properties for the boards.

ELECTROTHERAPY

16. High-voltage pulsed current (HVPC) is used for wound healing because it:

A. Produces strong muscle contractions to improve circulation

B. Creates a pulsatile DC-like current that drives ion flow and promotes wound healing factors via galvanotaxis

C. Heats the wound bed to increase angiogenesis

D. Delivers antibiotics into the wound via iontophoresis

✓ Answer: B

💡 Rationale & Explanation:

HVPC: twin-peaked monophasic waveform, voltage up to 500V (though peak current is low — doesn't burn). Used for chronic wound healing. Mechanism: GALVANOTAXIS — cells (fibroblasts, keratinocytes, macrophages, neutrophils) migrate toward or away from electrical poles. NEGATIVE pole attracts neutrophils early (antimicrobial effect — choose negative for infected/necrotic wounds). POSITIVE pole attracts fibroblasts, keratinocytes (promote epithelialization — switch to positive for clean granulating wounds). FDA cleared for wound healing.

EXERCISE SCIENCE

17. The overload principle states:

A. Exercise must be performed at maximum effort every session

B. The training stimulus must EXCEED the current capacity of the system (progressive overload)

C. The same exercise program should be maintained for 6 months before modification

D. Only resistance training produces overload; cardiovascular training does not

✓ Answer: B

💡 **Rationale & Explanation:**

Overload principle: muscles, cardiovascular, and metabolic systems adapt ONLY when challenged beyond their current capacity. To continue improving, you must PROGRESSIVELY increase the overload over time (SAID principle — Specific Adaptation to Imposed Demand). Ways to increase overload: increase weight, reps, sets, frequency, reduce rest time, increase speed, change exercise. If you train at the SAME level indefinitely, adaptation STOPS (plateau). The corollary: REVERSIBILITY — adaptations are lost when training stops ('use it or lose it').

├— PHYSICAL AGENTS

18. Low-level laser therapy (LLLT/photobiomodulation) exerts its therapeutic effects through:

A. Thermal heating of the tissue similar to US

B. Absorption of photons by cytochrome c oxidase in the mitochondria, increasing ATP production and cell signaling

C. Electrical current stimulation of cells

D. Mechanical compression of tissue

✓ Answer: B

💡 **Rationale & Explanation:**

LLLT/photobiomodulation mechanism: specific wavelengths of light (typically 600-1000 nm, red and near-infrared) are absorbed by CYTOCHROME C OXIDASE in the inner mitochondrial membrane. This increases the electron transport chain activity → more ATP production → enhanced cellular metabolism → faster healing, reduced inflammation, and analgesic effects. Effects: fibroblast proliferation, collagen synthesis, nerve regeneration, inflammation reduction. LLLT is NOT thermal — it's photochemical/photobiological. Growing evidence base for tendinopathy.

├— CARDIOPULMONARY PT

19. During a 6-minute walk test (6MWT), the expected normal distance for a healthy adult is approximately:

A. 200-300 meters

B. 300-400 meters

C. 400-700 meters

D. >900 meters

✓ Answer: C

💡 **Rationale & Explanation:**

6MWT reference values for healthy adults: ~400-700+ meters, depending on age, sex, and fitness. Typical values: healthy 60-year-old male ≈ 550-600m; healthy 60-year-old female ≈ 480-540m. Patients with heart failure, COPD, or pulmonary hypertension typically walk <350-400m. Minimal clinically important difference (MCID) for COPD: ~25-30m. The 6MWT is a submaximal functional test correlating with VO2 and functional independence. Exercise should be stopped if: SpO2 drops below 85-88%, patient develops chest pain, severe dyspnea, or dizziness.

EXERCISE SCIENCE

20. Open kinetic chain (OKC) exercises versus closed kinetic chain (CKC) exercises:

A. OKC exercises are always safer than CKC

B. OKC exercises have the distal segment free to move (non-weight-bearing), while CKC exercises have the distal segment fixed

C. CKC exercises isolate single muscles while OKC involves multiple joints

D. OKC exercises are preferred in ACL rehabilitation throughout all stages

✓ Answer: B

💡 Rationale & Explanation:

OKC = distal segment FREE (not fixed) — can move independently. Example: seated knee extension (foot not fixed), biceps curl. CKC = distal segment FIXED (weight-bearing). Example: squats, lunges, step-ups. Advantages of CKC: multiple joints work together, more functional, lower shear forces on ACL (co-contraction stabilizes the joint). In ACL rehabilitation: early post-op = CKC preferred; OKC terminal knee extension (90-40°) is permitted early; OKC open full range delayed until later stages. Both have important roles. The outdated blanket restriction of OKC in ACL rehab is no longer current evidence.

PHYSICAL AGENTS

21. The physiological effects of superficial heat include:

A. Vasoconstriction and decreased metabolic rate

B. Vasodilation, increased tissue extensibility, increased metabolic rate, and decreased muscle spasm

C. Increased tissue stiffness and reduced nerve conduction

D. Decreased edema and reduced nerve conduction velocity

✓ **Answer: B**

💡 **Rationale & Explanation:**

Superficial heat (hot packs, paraffin, hydrotherapy at ~40-45°C) physiological effects: VASODILATION → increased blood flow → brings in nutrients and removes waste; INCREASED METABOLIC RATE (body temperature increases chemical reaction rates); INCREASED TISSUE EXTENSIBILITY (collagen becomes more pliable — the optimal time to stretch is DURING or immediately AFTER heat application — 'stretch while it's hot!'); DECREASED MUSCLE SPASM (via reflex relaxation through cutaneous thermoreceptors); DECREASED PAIN (Gate control via thermoreceptor activation + reduced spasm). All of these beneficial effects reverse when the tissue cools back to normal temperature — timing matters.

├— EXERCISE SCIENCE

22. The 'detraining effect' (reversibility principle) after cessation of exercise training begins within:

A. 6 months to 1 year

B. 2-4 weeks — cardiovascular fitness begins declining within days; strength losses begin within 2-4 weeks

C. Only after complete bed rest for 3+ months

D. The detraining effect only affects endurance, not strength

✓ **Answer: B**

💡 **Rationale & Explanation:**

Detraining (reversibility): the adaptations gained from exercise training are LOST when training stops, at varying rates. CARDIOVASCULAR FITNESS: VO2max begins declining within 3-5 DAYS of cessation; 50% of gains lost within 4-12 weeks; endurance performance significantly decreases within 2-4 weeks. STRENGTH: muscle strength declines more slowly — significant losses begin within 2-4 weeks in trained individuals, sooner in untrained; neural adaptations reverse first, then

hypertrophy reverses. PRACTICAL: for injured athletes, maintaining even 30% of usual training volume significantly slows detraining. Relative rest (cross-training, pool running, upper body work) is CRITICAL during injury to preserve training adaptations.

ELECTROTHERAPY

23. Ultrasound effective radiating area (ERA) and beam nonuniformity ratio (BNR) are important because:

A. Higher ERA = smaller treatment area; lower BNR = more uniform beam (safer, better quality)

B. ERA is the total surface area of the transducer; BNR has no clinical significance

C. Both must be as high as possible for effective treatment

D. Lower ERA means the treatment is less effective

✓ Answer: A

💡 Rationale & Explanation:

ERA (Effective Radiating Area): the portion of the transducer face that actually emits US energy. A smaller ERA relative to the total transducer face means less effective coverage — you need to use smaller circles and treat thoroughly. BNR (Beam Nonuniformity Ratio): the ratio of the PEAK intensity to the AVERAGE intensity in the beam. Normal BNR: 2:1 to 6:1. A LOWER BNR means the beam is more UNIFORM (more consistent energy distribution — safer and more predictable). A high BNR (hot spots in the beam) can cause localized burning at points of high intensity. Always check BNR when using US equipment — high BNR machines are less safe. BNR should ideally be ≤6:1. This is tested in Philippine PT boards in the modalities section.

PHYSICAL AGENTS

24. Contrast therapy (alternating hot and cold) is used for:

A. Acute inflammatory conditions

B. Subacute and chronic injuries to reduce edema, relieve pain, and improve circulation through vascular pumping

C. Burns and open wounds

D. Severe peripheral vascular disease

✓ Answer: B

💡 **Rationale & Explanation:**

Contrast therapy: alternating HOT (3-4 min, 38-44°C) and COLD (1 min, 10-18°C) immersion. This creates a VASCULAR PUMPING effect — alternating vasodilation (heat) and vasoconstriction (cold) promotes tissue fluid exchange, reduces edema, and improves circulation. It's used for SUBACUTE and CHRONIC conditions (NOT acute — in acute injuries, cold only is preferred; contrast therapy in acute phase may increase swelling). Best for: subacute ankle sprains, hand/foot edema, sports injuries transitioning from acute to subacute. Typical ratio: 3:1 or 4:1 (hot:cold). Start and end with COLD to minimize post-treatment swelling. The physiological mechanism is primarily local circulatory, not neurological.

├— CARDIOPULMONARY PT

25. The 'metabolic equivalent' (MET) for rest is 1 MET. Moderate-intensity exercise corresponds to:

A. 1-2 METs

B. 3-6 METs

C. 7-10 METs

D. >10 METs

✓ Answer: B

💡 **Rationale & Explanation:**

MET (Metabolic Equivalent of Task): 1 MET = resting metabolic rate (~3.5 mL O2/kg/min). Activities classified as: Light = <3 METs (slow walking 2 mph = 2.5 METs, casual housework); Moderate = 3-6 METs (brisk walking at 3-4 mph = 3.5-5 METs, cycling at moderate pace, doubles tennis); Vigorous = >6 METs (jogging = 7 METs, running 6 mph = 10 METs, singles tennis). In cardiac rehab, initial exercise is prescribed at 2-4 METs, progressing based on tolerance. Discharge from hospital: patient should be able to perform 3-4 METs activities safely (stair climbing, moderate ADLs) before going home. MET tables help guide activity prescription.

PHYSICAL AGENTS

26. Cervical traction is applied to relieve radicular symptoms. The RECOMMENDED traction force for cervical traction is:

A. 5-10 lbs (2-4.5 kg) for neurological symptoms

B. 10-15% of body weight (approximately 7-15 lbs / 3-7 kg) for cervical disc herniation symptoms

C. 50% of body weight

D. 40-50 lbs for all cervical conditions

✓ Answer: B

💡 Rationale & Explanation:

Cervical traction force guidelines: To SEPARATE cervical vertebrae: ~25-30 lbs (11-14 kg) needed. For SYMPTOM RELIEF in radiculopathy: lower forces are used initially — typically 10-20 lbs (4.5-9 kg), which is approximately 10-15% of body weight, to widen the intervertebral foramina and reduce nerve root pressure. For MUSCLE RELAXATION: even lighter forces (7-10 lbs). Start low, progress gradually. Contraindications: RA with atlantoaxial instability, fracture/dislocation, severe osteoporosis, malignancy, cord compromise, acute cervical strain. Cervical traction can be mechanical (motor-driven) or manual. Best evidence: for cervical radiculopathy with disc herniation. Angle: 15-30° neck flexion for cervical traction.

EXERCISE SCIENCE

27. When training for MUSCULAR ENDURANCE (ability to perform many repetitions), the recommended parameters are:

A. 1-6 reps at >85% 1RM, long rest periods

B. 7-12 reps at 67-85% 1RM, 60-90 second rest

C. ≥12-15 reps at <67% 1RM, short rest periods (<60 seconds)

D. 3-5 reps with very slow eccentric phases

✓ Answer: C

💡 **Rationale & Explanation:**

ACSM resistance training guidelines: MUSCULAR ENDURANCE = higher repetitions, lower load, shorter rest. Guidelines: ≥12-15 reps (often 15-25+), at <67% 1RM (light to moderate load), rest periods ≤30-60 seconds. HYPERTROPHY = 6-12 reps, 67-85% 1RM, 60-90 second rest. STRENGTH = 1-6 reps, ≥85% 1RM, 2-5 minute rest (full neural recovery). POWER = 1-6 explosive reps, 30-60% 1RM (for speed), long rest. In PT practice: most patients start with endurance protocols (high reps, low load) before progressing to strength protocols — especially post-surgery, elderly patients, and early rehabilitation phases.

PHYSICAL AGENTS

28. Traction therapy for lumbar disc herniation: which position OPENS the lumbar posterior intervertebral foramen maximally?

A. Prone with pillows under abdomen

B. Supine with hips and knees at 90° (hook-lying position)

C. Sitting upright with lumbar lordosis

D. Prone with no support (flat position)

✓ Answer: B

💡 **Rationale & Explanation:**

Lumbar traction for nerve root decompression: position the patient in SUPINE with HIPS AND KNEES AT 90° (hip and knee each flexed to 90°, legs resting on a support). This FLATTENS the lumbar lordosis, WIDENS the posterior intervertebral spaces and foramina, and reduces lumbar facet joint compression. By separating the vertebrae in a flexed position, traction more effectively opens the neuroforamen where the nerve root is compressed. Traction force for lumbar: typically 25-50% of body weight. Intermittent traction (alternating pull and release) is generally better tolerated and more effective for disc herniation than static traction.

├— EXERCISE SCIENCE

29. Delayed onset muscle soreness (DOMS) peaks at:

A. Immediately after exercise (0-2 hours)

B. 24-72 hours after unaccustomed exercise, especially eccentric exercise

C. 5-7 days after exercise

D. Only during repeated bouts of the same exercise

✓ Answer: B

💡 **Rationale & Explanation:**

DOMS (Delayed Onset Muscle Soreness): muscle soreness, stiffness, and tenderness that peaks 24-72 hours AFTER unaccustomed exercise — especially ECCENTRIC exercise (downhill running, plyometrics, heavy squats, lowering phase of exercises). DOMS is NOT present during the exercise itself; it develops gradually after. Mechanism: microtrauma to muscle fibers and connective tissue → local inflammatory response → prostaglandins and bradykinin sensitize nociceptors → soreness. Important: DOMS is NORMAL and not harmful. The 'repeated bout effect' — subsequent bouts of the same exercise produce LESS DOMS,

as the muscle adapts. Light activity (not rest) is the best management for DOMS — it reduces symptoms faster than complete rest.

PHYSICAL AGENTS

30. Laser therapy biostimulation is indicated for:

A. Malignant tumors to enhance cellular activity

B. Wound healing, tendinopathy, lymphedema, and nerve regeneration — promoting cellular repair and pain modulation

C. Cauterizing wounds for hemostasis

D. Ablating superficial skin lesions

✓ Answer: B

💡 **Rationale & Explanation:**

Low-level laser therapy (LLLT / photobiomodulation) therapeutic INDICATIONS: wound healing acceleration, tendinopathy (Achilles, patellar, lateral epicondyle), lymphedema management (stimulates lymphatic vessel contraction), peripheral nerve regeneration, rheumatoid arthritis and OA (anti-inflammatory effects), muscle fatigue and recovery, and chronic pain. CONTRAINDICATIONS: malignancy (may stimulate tumor cell growth — absolute contraindication), over the eyes (retinal damage), over the thyroid, over a pregnant uterus, over photosensitive areas, epileptic patients (visible wavelengths). LLLT for wound healing and tendinopathy has Grade B evidence. Parameters: measured in Joules per cm^2 (energy density) — dose must be within the therapeutic window (Arndt-Schulz law).

ELECTROTHERAPY

31. The 'Russian current' in electrotherapy is:

A. A low-frequency AC current at 2500 Hz

B. A medium-frequency AC current at 2500 Hz delivered in bursts (50 bursts/second), originally developed to enhance muscle strength in athletes

C. A DC current for wound healing

D. A high-voltage monophasic current

✓ Answer: B

💡 **Rationale & Explanation:**

Russian current (Kots current): named after Dr. Yakov Kots who used it with Soviet Olympic athletes. Medium-frequency AC (2500 Hz) delivered in BURST MODE — 50 bursts per second, with each burst lasting 10 ms (50% duty cycle). The 2500 Hz frequency reduces skin impedance for more comfortable, deeper muscle penetration; the 50 burst/second frequency creates tetanic muscle contractions. Used for: muscle strengthening, re-education after injury, preventing atrophy during immobilization. The key claim is that Russian current produces STRONGER contractions than lower-frequency NMES with less patient discomfort. Modern research shows it's comparable to other NMES waveforms. Helpful for quadriceps re-education post-TKA and post-ACL reconstruction.

├─ PHYSICAL AGENTS

32. Fluidotherapy uses dry heat through heated cellulose particles and is indicated for:

A. Deep tissue heating of large joints

B. Superficial heating and sensory desensitization of the hand/foot — useful for CRPS and hypersensitivity

C. Wound debridement

D. Burns treatment

✓ Answer: B

💡 **Rationale & Explanation:**

Fluidotherapy: a dry heat modality using a cabinet filled with finely granulated CELLULOSE PARTICLES suspended in warm air (38-48°C). The extremity is immersed in the moving particles. Benefits: SUPERFICIAL HEAT delivery to irregular surfaces (hands, feet); SENSORY DESENSITIZATION (the constant movement of particles provides sustained sensory input — useful for CRPS Type I, hypersensitivity post-injury); allows SIMULTANEOUS ACTIVE EXERCISE of the hand/foot within the treatment (unlike paraffin). Advantages over paraffin: can do active exercise during treatment; better for CRPS desensitization; no open fire risk. Contraindications: open wounds, infections, impaired sensation.

├─ EXERCISE SCIENCE

33. 'Periodization' in exercise programming refers to:

A. Performing the same exercise program without variation

B. The systematic variation of training variables (volume, intensity, exercise selection) over time to prevent plateaus, manage fatigue, and peak performance for a specific goal

C. Daily exercise monitoring

D. Scheduling rest days only

✓ Answer: B

💡 **Rationale & Explanation:**

Periodization: the structured manipulation of training VOLUME (total work done), INTENSITY (how hard), and EXERCISE SELECTION over time, organized into periods (macrocycles, mesocycles, microcycles). Purpose: 1) Prevent TRAINING PLATEAUS (progressive overload demands variation); 2) Manage CUMULATIVE FATIGUE (alternating high and low volume/intensity periods); 3) PEAK PERFORMANCE for a specific date (e.g., sports season, marathon). Types: Linear periodization (progressively increase intensity, decrease volume); Undulating periodization (vary intensity and volume more frequently — week to week or session to session). In PT/rehabilitation:

periodization applies to post-surgical rehab phases — each phase has different goals, volume, and intensity targets.

PHYSICAL AGENTS

34. The physiological mechanism of cryotherapy pain relief includes:

A. Vasodilation and increased tissue metabolism

B. Reduced nerve conduction velocity, decreased nociceptor activity, and counter-irritation (endorphin release)

C. Increased tissue temperature causing endorphin release

D. Blocking muscle acetylcholine receptors

✓ Answer: B

💡 Rationale & Explanation:

Cryotherapy (cold therapy) pain mechanisms: 1) Reduced nerve CONDUCTION VELOCITY — cold slows all nerve conduction, especially smaller pain fibers (C-fibers slow more than A-beta fibers); 2) Decreased NOCICEPTOR ACTIVITY — cold reduces the sensitivity and firing rate of nociceptors (pain receptors) in the tissue; 3) COUNTER-IRRITATION — the cold sensation provides a competing sensory input (gate control); 4) Reduced tissue METABOLISM → reduced inflammatory mediator release; 5) Reduced EDEMA formation (vasoconstriction). The 'HUNTING RESPONSE' (Lewis reaction): after prolonged cold application, periodic vasodilation occurs (~8-10 minutes) to prevent frostbite — cycles of vasoconstriction and vasodilation. This is why ice application is usually limited to 10-15 minutes.

CARDIOPULMONARY PT

35. Post-coronary artery bypass graft (CABG) surgery, the PRIMARY respiratory complication that PT aims to prevent is:

A. Pulmonary embolism

B. Atelectasis (collapse of lung segments) leading to pneumonia

C. Pleural effusion

D. Spontaneous pneumothorax

✓ Answer: B

💡 Rationale & Explanation:

Post-CABG (open chest) respiratory complications: the STERNOTOMY incision + general anesthesia + pain + reduced mobility all contribute to ATELECTASIS (collapse of alveoli and lung segments) and subsequent pneumonia. PT respiratory management: DEEP BREATHING EXERCISES (diaphragmatic breathing, incentive spirometry to maximize inspiratory capacity); EARLY MOBILIZATION (ambulation reduces atelectasis — 'the best medicine is movement'); COUGHING exercises with pillow splinting (to clear secretions without pain from the sternotomy); HUFFING technique (forced expiration with open glottis — less straining on the sternum); POSITIONING (sitting upright maximizes lung volumes). The left lower lobe is most commonly affected (due to compression from the heart during surgery). Early ambulation and breathing exercises = best prevention.

├─ PHYSICAL AGENTS

36. Shortwave diathermy is CONTRAINDICATED in all of the following EXCEPT:

A. Patients with pacemakers

B. During pregnancy over the abdomen

C. Chronic non-inflammatory muscle stiffness in a patient with no metal implants

D. Areas with metal implants

✓ Answer: C

💡 Rationale & Explanation:

Shortwave diathermy (SWD) CONTRAINDICATIONS: Metal implants (plates, screws, joint replacements — metal concentrates the electromagnetic field causing burns); Pacemakers (electromagnetic interference); Pregnancy over the abdominal/pelvic area; Malignancy; Active bleeding/hemorrhage; Fever; Areas of impaired sensation; Moist dressings/wounds over the treatment area; Contact lenses (for head SWD); Gonads (fertility concerns). INDICATIONS (when contraindications are absent): Chronic muscle stiffness, joint contractures, subacute/chronic musculoskeletal conditions requiring DEEP HEATING. A patient with chronic non-inflammatory muscle stiffness and NO metal implants = an appropriate SWD candidate. Answer C is NOT a contraindication — it's an INDICATION.

├─ EXERCISE SCIENCE

37. The 'SAID' principle stands for:

A. Slow And Incremental Development

B. Specific Adaptation to Imposed Demand — the body adapts specifically to the type of exercise performed

C. Strength And Intensity Diagram

D. Sequential Active Integrated Dynamics

✓ Answer: B

💡 **Rationale & Explanation:**

SAID Principle (Specific Adaptation to Imposed Demand): the body adapts SPECIFICALLY to the TYPE, INTENSITY, SPEED, and MODE of exercise imposed upon it. Examples: strength training → strength adaptation (NOT endurance); running → running-specific adaptations (NOT swimming endurance); fast-velocity training → improved rate of force development at high speeds (NOT max strength). This means: to improve SPORT-SPECIFIC PERFORMANCE, training must MATCH the demands of the sport (specificity). In rehabilitation: exercises must be FUNCTIONAL and TASK-SPECIFIC to produce meaningful gains. Isolated muscle exercises alone don't necessarily improve functional task

performance — you must practice the TASK itself. SAID + Progressive Overload = the two most fundamental principles of exercise adaptation.

├— CARDIOPULMONARY PT

38. The Borg dyspnea scale (modified Borg CR10) for breathlessness: a score of 3 corresponds to:

A. No breathlessness at all

B. Moderate breathlessness

C. Maximum breathlessness

D. Severe/very severe breathlessness

✓ Answer: B

💡 **Rationale & Explanation:**

Modified Borg CR10 Dyspnea Scale (0-10): 0 = Nothing at all; 0.5 = Very, very slight (just noticeable); 1 = Very slight; 2 = Slight; 3 = MODERATE; 4 = Somewhat severe; 5 = Severe; 6-7 = Very severe; 8-9 = Very, very severe; 10 = Maximum. For exercise in cardiopulmonary patients: aim for dyspnea score of 3-5 (moderate to somewhat severe) for optimal training stimulus without dangerous overexertion. Scores ≥7 during exercise = stop or significantly reduce intensity. Always use in combination with RPE, SpO2, and HR monitoring. The Borg Dyspnea Scale is specifically for breathlessness (not exertion effort — that's the RPE scale). Use BOTH scales together in cardiopulmonary PT.

├— PHYSICAL AGENTS

39. Moist heat vs. dry heat: which form penetrates DEEPER and is generally more therapeutic?

A. Dry heat — it produces higher skin temperatures

B. Moist heat — it penetrates approximately twice as deep as dry heat at the same temperature due to better heat conductance

C. Both penetrate identically

D. Dry heat penetrates deeper because there is no moisture barrier

✓ Answer: B

💡 **Rationale & Explanation:**

MOIST HEAT is superior to dry heat at equivalent temperatures: 1) Higher HEAT CONDUCTANCE — water conducts heat much more efficiently than air; moist heat transfers heat into the tissue at a faster rate. 2) DEEPER PENETRATION — moist heat penetrates approximately TWICE AS DEEP as dry heat. 3) More COMFORTABLE — the same thermal dose feels more comfortable with moist heat (the moist medium conducts evenly). 4) PREVENTS SKIN DRYING — dry heat can dehydrate and crack skin with prolonged use. For hot packs: always wrap the pack in 6-8 layers of toweling; the pack should feel comfortably warm, not burning. Moist heat application: 15-20 minutes; monitor skin every 5 minutes.

├─ EXERCISE SCIENCE

40. The term 'functional capacity evaluation' (FCE) in PT practice refers to:

A. A standardized cardiovascular stress test

B. A comprehensive systematic assessment of an individual's physical and functional abilities, primarily used for work-related disability determination and return-to-work planning

C. Assessment of daily living activities in a hospital setting

D. Cognitive function testing for TBI patients

✓ Answer: B

💡 **Rationale & Explanation:**

Functional Capacity Evaluation (FCE): a standardized, systematic assessment of a person's PHYSICAL CAPACITIES and FUNCTIONAL ABILITIES in relation to WORK demands. Used for: 1) RETURN-TO-

WORK decision-making (can the patient safely return to their job?); 2) Disability determination and insurance purposes; 3) Identifying physical abilities and limitations; 4) Designing work hardening programs. FCE components: strength (grip, push, pull, carry), mobility (bending, lifting, reaching), endurance (sustained activity), and consistency of effort. Commonly used FCE systems: Isernhagen Work Systems, Blankenship, WorkWell. In the Philippines: FCE is used in occupational and industrial rehabilitation settings, and in medicolegal cases to objectively document physical capacity.

⊢ PHYSICAL AGENTS

41. Transcutaneous electrical nerve stimulation (TENS) is CONTRAINDICATED over:

A. The upper trapezius for neck pain

B. The anterior neck (carotid sinus and larynx), and never over the eyes, skull, or transcardiac

C. The knee for OA pain

D. The lumbar area for non-pregnant patients with back pain

✓ Answer: B

💡 **Rationale & Explanation:**

TENS contraindications: ANTERIOR NECK — risk of laryngospasm (over larynx) and reflex cardiovascular effects (over carotid sinus — can cause syncope or arrhythmia); EYES — risk of increased intraocular pressure; TRANSCARDIAC placement (current crossing the heart) — risk of arrhythmia; PACEMAKERS; PREGNANCY (especially over the uterus/abdomen); EPILEPSY (over the head, potential seizure trigger); MALIGNANCY; ACTIVE DVT. The upper trapezius, knee, and lumbar area are all appropriate TENS application sites for pain management (with no contraindications present). Carotid sinus and larynx = ABSOLUTE contraindication — memorize this for the boards.

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42. The physiological effects of MICROWAVE DIATHERMY (MWD) include:

A. Heating primarily bone and cartilage

B. Heating muscle and subcutaneous fat selectively via electromagnetic energy at 2450 MHz, penetrating 3-5 cm

C. Heating the epidermis only

D. Producing non-thermal cavitation effects

✓ Answer: B

💡 **Rationale & Explanation:**

Microwave diathermy (MWD): uses electromagnetic radiation at 2450 MHz (or 915 MHz). Penetration: 3-5 cm — deeper than infrared but shallower than SWD. Selective heating: tissues with HIGH WATER CONTENT absorb microwave energy preferentially (muscle > fat > bone). Unlike SWD (which heats primarily muscle via ionic agitation), MWD heats through MOLECULAR ROTATION of water dipoles. Clinical uses: muscle spasm, subacute/chronic musculoskeletal conditions, heating joint contractures. Contraindications: metal implants (concentrate energy), pacemakers, malignancy, joints with fluid (may overheat synovial fluid), genitals. The 2450 MHz frequency is also used in microwave ovens — same physics, different application power. MWD is less commonly used than SWD in current clinical practice.

├─ EXERCISE SCIENCE

43. 'Eccentric training' for muscle hypertrophy is superior to concentric training because:

A. Eccentric training uses more motor units

B. Eccentric forces are 20-40% greater per unit of muscle cross-sectional area, causing more mechanical microtrauma and triggering a greater hypertrophic response — leading to greater muscle fiber growth

C. Eccentric training requires no energy expenditure

D. Eccentric training produces less DOMS which allows more frequent training

✓ **Answer: B**

💡 **Rationale & Explanation:**

Eccentric training advantages for hypertrophy: 1) GREATER FORCE PRODUCTION: eccentric forces are significantly higher than concentric at the same load — more mechanical tension on muscle fibers; 2) MORE MECHANICAL MICROTRAUMA: the eccentric phase causes controlled microtears in the sarcomere (Z-disc disruption) — the primary stimulus for protein synthesis and hypertrophy; 3) Greater MUSCLE DAMAGE triggers more satellite cell activation → more protein synthesis; 4) Activates TYPE II FIBER (fast-twitch) preferentially — the primary hypertrophy target; 5) Evidence: eccentric-focused training (slow lowering phase, accentuated eccentric) produces GREATER muscle cross-sectional area gains than concentric-only training at similar loads. Note: MORE DOMS (not less) — this is why progressive introduction of eccentric training is important.

├— CARDIOPULMONARY PT

44. The 'Borg CR10 dyspnea scale' and the 'modified MRC (mMRC) breathlessness scale' differ in that:

A. Both measure the same thing identically

B. Borg CR10 is used DURING exercise to rate CURRENT breathlessness; mMRC is a fixed 5-level scale (0-4) describing breathlessness during DAILY ACTIVITIES — used for COPD severity classification

C. mMRC is more sensitive to change

D. Borg CR10 only applies to cardiac patients

✓ **Answer: B**

💡 **Rationale & Explanation:**

mMRC (Modified Medical Research Council Dyspnea Scale): 5 levels (0-4): 0 = breathless only with strenuous exercise; 1 = breathless when hurrying on level ground; 2 = walks slower than others on level or

stops after 100m; 3 = stops after a few minutes on level ground; 4 = too breathless to leave house. Used for: COPD severity classification (GOLD guidelines), assessing baseline breathlessness. mMRC ≥2 = significant dyspnea. Borg CR10: real-time assessment of breathlessness DURING EXERCISE (changes moment to moment). Both have utility in cardiopulmonary PT: mMRC for baseline assessment; Borg for exercise intensity monitoring. Know both for PRC board examinations.

PHYSICAL AGENTS

45. The BIOSTIMULATION effect of LLLT (low-level laser therapy) on NERVES includes:

A. Permanent destruction of damaged nerves

B. Stimulation of Schwann cell activity, axonal sprouting, and myelination — promoting peripheral nerve REGENERATION after injury

C. Blocking nerve conduction as an analgesic mechanism

D. Increasing nerve conduction velocity in injured nerves to supranormal levels

✓ Answer: B

💡 Rationale & Explanation:

LLLT peripheral nerve effects: multiple in vitro and animal studies (and some human RCTs) show LLLT promotes: 1) SCHWANN CELL PROLIFERATION and activity — critical for axon regeneration (Schwann cells provide the scaffold); 2) AXONAL SPROUTING and elongation from the proximal nerve stump; 3) MYELINATION of regenerating axons; 4) Reduction of SCAR TISSUE formation around healing nerves. Clinical applications: post-peripheral nerve injury/repair, carpal tunnel syndrome, Bell's palsy (facial nerve), post-herpetic neuralgia, peripheral neuropathy. Parameters for nerve regeneration: wavelength 780-850 nm, power density 5-50 mW/cm², energy density 1-4 J/cm². The biostimulation effect follows the Arndt-Schulz law — too much = inhibits regeneration.

EXERCISE SCIENCE

46. 'High-intensity interval training' (HIIT) compared to moderate-intensity continuous training (MICT) in cardiac rehabilitation:

A. HIIT is always contraindicated in cardiac patients

B. HIIT (e.g., 4×4 protocol: 4 minutes at 85-95% HRmax, 3 minutes at 50-70% HRmax, 4 intervals) produces SUPERIOR improvements in VO2max, cardiac output, and quality of life with COMPARABLE SAFETY to MICT in stable cardiac patients

C. MICT always produces better outcomes

D. HIIT is only for healthy athletes

✓ Answer: B

💡 **Rationale & Explanation:**

HIIT in cardiac rehabilitation: extensive research (including the landmark Wisloff group studies from NTNU Norway) shows: 1) VO2max improvements with HIIT are APPROXIMATELY TWICE those achieved with MICT; 2) Left ventricular remodeling, stroke volume, and cardiac output improve more with HIIT; 3) Safety profile comparable to MICT in appropriately selected stable cardiac patients; 4) Quality of life improvements are superior. The 4×4 HIIT protocol (Norwegian protocol) is the most studied. Patient selection: stable CAD, post-MI, post-CABG, heart failure (with caution). Contraindications: unstable angina, recent ACS, uncontrolled arrhythmias, decompensated heart failure. HIIT is now included in contemporary cardiac rehab guidelines.

PHYSICAL AGENTS

47. Phonophoresis (ultrasound-facilitated drug delivery) is MOST effective for delivering drugs that are:

A. Large molecular weight proteins

B. Lipophilic (fat-soluble) and small to medium molecular weight molecules — as they penetrate lipid bilayers more easily with US assistance

C. Ionic drugs only (like iontophoresis)

D. Water-soluble drugs only

✓ Answer: B

💡 **Rationale & Explanation:**

Phonophoresis drug characteristics: the most effective drugs for phonophoresis are: 1) LIPOPHILIC (fat-soluble) — can penetrate the lipid bilayer of the stratum corneum more effectively when aided by US; 2) SMALL TO MEDIUM MOLECULAR WEIGHT — physically smaller molecules pass through skin pores more easily; 3) Topical formulation compatibility with US coupling gel. Most effective drugs: HYDROCORTISONE (lipophilic, anti-inflammatory), DICLOFENAC (lipophilic NSAID), LIDOCAINE (local anesthetic). Drug absorption is enhanced by: US-induced acoustic streaming increasing membrane permeability, temporary disruption of lipid bilayer, increased local blood flow (thermal effect). Compare iontophoresis: requires IONIC (charged) drugs — hydrocortisone sodium succinate (anion), lidocaine (cation).

├─ EXERCISE SCIENCE

48. 'Resistance training' for older adults (65+) according to ACSM guidelines should include:

A. Avoiding any resistance training due to fracture risk

B. Progressive resistance training 2-3 days/week, 8-10 exercises targeting major muscle groups, 10-15 repetitions at moderate intensity (60-70% 1RM) — progressing as tolerated

C. Maximum intensity resistance training only

D. Low-intensity walking only

✓ Answer: B

💡 **Rationale & Explanation:**

ACSM resistance training guidelines for older adults: FREQUENCY: 2-3 non-consecutive days/week. INTENSITY: MODERATE (60-70% 1RM for novice) — can start at lighter loads for very deconditioned seniors. VOLUME: 1-3 sets of 8-10 exercises targeting all major muscle groups; 10-15 repetitions (higher reps at moderate loads = safer for older joints). PROGRESSION: increase load by 2-10% when 1-2 reps above target range can be completed. BENEFITS: prevents sarcopenia (age-related muscle loss), reduces fracture risk (improves BMD), reduces fall risk (improves balance and strength), improves functional independence, metabolic benefits. Resistance training is one of the MOST IMPORTANT interventions for healthy aging — PT should actively prescribe it for all older adults without contraindications.

⊢ PHYSICAL AGENTS

49. In COLD LASER (LLLT) application parameters, the 'power density' (irradiance) is measured in:

A. Joules (J)

B. Milliwatts per square centimeter (mW/cm²)

C. Hz (frequency)

D. Meters (m)

✓ **Answer: B**

💡 **Rationale & Explanation:**

LLLT measurement parameters: POWER: measured in MILLIWATTS (mW) — the output power of the laser. POWER DENSITY (irradiance): MILLIWATTS per SQUARE CENTIMETER (mW/cm²) — the intensity of light per unit area. ENERGY: JOULES (J) = Power (W) × Time (seconds). ENERGY DENSITY (fluence/dose): JOULES per SQUARE CENTIMETER (J/cm²) — the total energy delivered per unit area. This is the PRIMARY DOSAGE parameter for LLLT — the treatment dose is prescribed in J/cm². WAVELENGTH: measured in NANOMETERS (nm) — determines

tissue penetration (600-700 nm = red, superficial; 780-1000 nm = near-infrared, deeper). Clinical dose ranges: wound healing 0.5-4 J/cm²; pain relief 1-6 J/cm²; tendinopathy 2-6 J/cm². The Arndt-Schulz dose-response applies: too little = no effect; optimal dose = biostimulation; too much = inhibition.

├— CARDIOPULMONARY PT

50. In pulmonary rehabilitation for COPD patients, exercise training primarily improves:

A. FEV1 (lung function) directly

B. Exercise tolerance, dyspnea perception, and quality of life — without significantly improving lung function (FEV1) but improving the peripheral muscle and cardiovascular adaptations to exercise

C. Airway diameter

D. Alveolar surface area

✓ Answer: B

💡 **Rationale & Explanation:**

COPD exercise rehabilitation evidence: pulmonary rehabilitation (PR) consistently IMPROVES: EXERCISE CAPACITY (6MWT, VO2 peak — by 25-35%); DYSPNEA (Borg, mMRC scores); QUALITY OF LIFE (SGRQ, CRQ, CAT scores); MUSCLE STRENGTH (peripheral muscles); HOSPITAL ADMISSIONS (reduced). However, PR does NOT significantly improve LUNG FUNCTION (FEV1, FVC) — the underlying COPD structural changes (airway obstruction, emphysema, air trapping) are not reversible. The benefit comes from: peripheral muscle adaptations (improved oxidative capacity), better exercise efficiency, reduced ventilatory demand at the same work rate, psychological benefits, dyspnea coping strategies. This distinction — improving functional outcomes without improving FEV1 — is a key concept in cardiopulmonary PT.

PHYSICAL AGENTS

51. The 'duty cycle' of pulsed ultrasound refers to:

A. The intensity of the ultrasound beam

B. The PERCENTAGE OF TIME the ultrasound is actually ON during the treatment cycle (e.g., 20% duty cycle = ultrasound is ON for 20% and OFF for 80% of each pulse cycle)

C. The frequency of the ultrasound

D. The area of the transducer

✓ Answer: B

💡 **Rationale & Explanation:**

Duty cycle (pulsed ultrasound): the ratio of the ON time to the TOTAL cycle time, expressed as a percentage. FORMULA: Duty cycle = ON time / (ON time + OFF time) × 100%. Typical pulsed modes: 20% duty cycle (most common — 2ms ON, 8ms OFF per 10ms cycle); 50% duty cycle (1ms ON, 1ms OFF). EFFECT: A 20% duty cycle delivers only 20% of the thermal energy compared to continuous US at the same intensity — primarily NON-THERMAL effects (acoustic streaming, cavitation). Low duty cycle = predominantly non-thermal effects = preferred for ACUTE injuries. Higher duty cycle or continuous = more thermal effects = preferred for CHRONIC conditions requiring deep heating. Always check: is this an acute or chronic condition? That determines the duty cycle choice.

EXERCISE SCIENCE

52. The 'minimal dose' of exercise for health benefits in sedentary adults according to current evidence is:

A. At least 2 hours of vigorous exercise daily

B. 150 minutes/week of moderate-intensity OR 75 minutes/week of vigorous-intensity aerobic activity, plus muscle-strengthening activities

2 days/week

C. 30 minutes of moderate activity once weekly

D. 1000 steps per day only

✓ Answer: B

💡 **Rationale & Explanation:**

WHO/ACSM minimum exercise recommendations for health: AEROBIC: 150-300 minutes/week of MODERATE-INTENSITY activity (brisk walking, cycling, swimming) OR 75-150 minutes/week of VIGOROUS-INTENSITY activity, OR equivalent combination. MUSCLE STRENGTHENING: 2+ days/week, all major muscle groups. ADDITIONAL BENEFITS: >300 min/week moderate or >150 min/week vigorous activity provides additional health benefits (reducing cancer, metabolic, and cardiovascular risk further). SEDENTARY BEHAVIOR: reduce sedentary time; any movement is better than none. In the Philippines context: the 'staircase versus elevator' and '30-minute walk' messaging aligns with these guidelines. PT should prescribe and advocate for meeting these minimum targets for ALL patients, not just those with specific conditions.

├— PHYSICAL AGENTS

53. Ultrasound applied OVER A SCAR to improve its extensibility should use:

A. Cold gel to reduce thermal effects

B. A coupling gel and the direct contact method, using gentle stroking technique over and around the scar tissue during the tissue's thermal window

C. High intensity continuous US for maximum effect

D. No coupling agent — dry technique

✓ Answer: B

💡 **Rationale & Explanation:**

Ultrasound for scar management: US is used over scars (especially keloid, hypertrophic, and post-surgical scars) to SOFTEN and IMPROVE THE EXTENSIBILITY of scar tissue. Mechanism: thermal effect increases collagen extensibility AND loosens collagen cross-links; non-thermal effects (acoustic streaming) may stimulate fibroblast activity and reduce collagen cross-linking. Application: DIRECT CONTACT with coupling gel (move transducer slowly over the scar); STRETCHING the scar during and immediately after the thermal window (within 3 minutes of US application) is CRITICAL — the heated collagen must be mechanically stretched while it's pliable, then maintained with positioning. Parameters: 1 MHz, 1.0-1.5 W/cm², continuous or pulsed 50%, 5-7 minutes. This is the therapeutic basis of US for contracture management.

├─ CARDIOPULMONARY PT

54. 'Inspiratory muscle training' (IMT) using a threshold loading device is indicated for:

A. All healthy athletes

B. Patients with RESPIRATORY MUSCLE WEAKNESS or chronic dyspnea (COPD, heart failure, SCI) — improves inspiratory muscle strength and reduces dyspnea

C. Patients with strong respiratory muscles only

D. Burns patients with chest wall trauma only

✓ Answer: B

💡 **Rationale & Explanation:**

Inspiratory muscle training (IMT): specifically targets the DIAPHRAGM and ACCESSORY INSPIRATORY MUSCLES. A threshold valve (Threshold IMT, PowerBreathe) requires the patient to generate sufficient negative inspiratory pressure to open the valve — providing progressive RESISTIVE LOADING to inspiratory muscles. Evidence: COPD — reduces dyspnea, improves 6MWT and exercise tolerance (especially when inspiratory muscle strength < 60% predicted); HEART

FAILURE — reduces dyspnea and improves cardiorespiratory fitness; SCI (especially C4-T6) — improves inspiratory capacity and reduces pneumonia incidence; Athletes — may improve endurance performance. Parameters: 30 repetitions/day at 50% maximal inspiratory pressure (MIP), 5-7 days/week, 8-12 weeks. Simple, inexpensive, and effective adjunct to PT programs.

├─ EXERCISE SCIENCE

55. 'Warm-up' before exercise physiologically provides:

A. Only psychological preparation

B. Increased muscle temperature (improves enzyme activity, O2 delivery via Bohr effect right shift, increased nerve conduction velocity), increased joint synovial fluid mobility, gradual CV system ramp-up — reducing injury risk

C. Cooling of the muscles for better performance

D. Reduction in heart rate before exercise

✓ Answer: B

💡 **Rationale & Explanation:**

Warm-up physiological benefits: 1) INCREASED MUSCLE TEMPERATURE (1-2°C) → improved enzyme activity, faster ATP production, better elasticity (reduced muscle/tendon tear risk); 2) BOHR EFFECT RIGHT SHIFT → hemoglobin releases O2 more readily at higher temperature (better O2 delivery to working muscles); 3) INCREASED NERVE CONDUCTION VELOCITY → faster reflexes, better coordination; 4) INCREASED SYNOVIAL FLUID MOBILITY → reduced joint stiffness; 5) GRADUAL CARDIOVASCULAR RAMP-UP → heart and vascular system adjust before full exercise demand; 6) INCREASED BLOOD FLOW TO MUSCLES (vasodilation); 7) PSYCHOLOGICAL READINESS. In PT: NEVER start rehabilitation exercises without a warm-up — especially in elderly patients, post-surgical patients, and cold environments. 5-10 minutes of light aerobic activity + dynamic stretching is the evidence-based warm-up.

PHYSICAL AGENTS

56. The contraindications to CERVICAL TRACTION include all EXCEPT:

A. Rheumatoid arthritis with atlantoaxial instability

B. Cervical disc herniation with unilateral arm pain (C7 radiculopathy)

C. Cervical fracture or instability

D. Vertebrobasilar insufficiency (VBI) symptoms

✓ Answer: B

💡 Rationale & Explanation:

Cervical traction CONTRAINDICATIONS: RA with atlantoaxial instability (traction can widen the C1-C2 gap → cord compression); Fracture or dislocation; Spinal cord myelopathy (traction can worsen cord compression); Vertebrobasilar insufficiency (VBI) — positional intolerance; HVLA manipulation history complications; Severe osteoporosis; Acute whiplash (first 3-4 weeks); Active infection/tumor; Pregnancy. INDICATION (NOT a contraindication): Cervical disc herniation with radiculopathy (C7 radiculopathy, arm pain) = PRIMARY INDICATION for cervical traction — it opens the neural foramen, reduces disc pressure, and relieves nerve root compression. This is the classic situation where cervical traction is prescribed. The question asks for the EXCEPTION to contraindications = what you CAN treat = cervical disc herniation with arm pain.

EXERCISE SCIENCE

57. The 'supercompensation' principle in periodization of training refers to:

A. Training to exhaustion repeatedly

B. The recovery phase after training stress, during which the body ADAPTS TO A HIGHER LEVEL THAN BEFORE training — if the next

training stimulus is applied at the peak of supercompensation, fitness progressively improves

C. Complete rest between all training sessions

D. The use of nutritional supplements for recovery

✓ Answer: B

💡 **Rationale & Explanation:**

Supercompensation: the foundational concept of periodization. After a training STRESS (overload), the body initially FATIGUES (performance decreases). During RECOVERY, the body not only returns to baseline but OVERSHOOTS it — achieving a HIGHER level of fitness/performance than before (SUPERCOMPENSATION). If the next training session is applied at the PEAK of supercompensation, the new baseline is higher → progressive fitness gains. If training is too FREQUENT (before supercompensation peak) → overtraining, declining performance. If training is too INFREQUENT (after supercompensation peak subsides) → no net gain. This timing is the basis of periodization — structured training loads with recovery periods to optimize the supercompensation cycle. In PT: after a hard rehabilitation session, schedule the next session to allow adequate recovery (typically 24-48 hours for the same muscle group).

⊢ PHYSICAL AGENTS

58. In choosing between 1 MHz and 3 MHz ultrasound for treating superficial structures (tendon at 1 cm depth), the BEST CHOICE is:

A. 1 MHz — always use lower frequency for safety

B. 3 MHz — higher frequency penetrates to the correct depth for superficial structures (0.5-2 cm) and maximizes energy delivery at the target depth

C. Both are equally effective

D. Neither — US should not be used on tendons

✓ Answer: B

💡 **Rationale & Explanation:**

US FREQUENCY SELECTION: Match frequency to TARGET DEPTH: 3 MHz = superficial (0.5-2 cm depth) = optimal for structures at 1 cm depth; 1 MHz = deeper (2-5 cm) = appropriate for hip joint, deep thigh muscles, deep shoulder muscles. A tendon at 1 cm depth (e.g., patellar tendon, wrist extensor tendons, anterior tibial tendon) = use 3 MHz. Why? At 3 MHz, the ABSORPTION and ENERGY DEPOSITION is greatest at 1-2 cm depth — more energy reaches the target tissue. Using 1 MHz on a 1 cm deep structure means most energy passes through the target and is absorbed deep — LESS effective and potentially heating unintended deep tissues. Always ask: 'How deep is my target tissue?' Then match frequency accordingly.

⊢ ELECTROTHERAPY

59. The 'sensory threshold' in TENS application is the current level at which:

A. The patient feels pain

B. The patient FIRST FEELS the tingling sensation — the minimum intensity for conventional TENS pain relief

C. Visible muscle twitching occurs

D. The patient can no longer tolerate the sensation

✓ Answer: B

💡 **Rationale & Explanation:**

TENS intensity thresholds: SENSORY THRESHOLD: the minimum current level at which the patient FIRST perceives the tingling sensation (no pain, no muscle contraction). Conventional TENS (gate control): applied at SENSORY LEVEL — comfortable tingling only, just above sensory threshold, never painful. MOTOR THRESHOLD: the minimum intensity that causes visible muscle TWITCHING. Acupuncture-like TENS: applied at MOTOR THRESHOLD level (produces muscle contractions). PAIN THRESHOLD: the current level at which the

sensation becomes UNCOMFORTABLE or PAINFUL — should NEVER be reached in therapeutic TENS. Clinical application: for conventional TENS, instruct patient to 'turn up until you feel a comfortable tingle — not painful, and not causing the muscle to jump.' Reassess during the session as sensory adaptation may occur (patient may need to increase intensity to maintain sensory threshold stimulation).

├─ PHYSICAL AGENTS

60. Cryotherapy duration: research suggests that TISSUE COOLING at 1-2 cm depth requires approximately:

A. 2-5 minutes of ice application

B. 10-15 minutes for superficial cooling, 20-30+ minutes for deeper tissue cooling at 1-2 cm depth

C. 1 minute of ice application

D. 60 minutes of ice application

✓ Answer: B

💡 **Rationale & Explanation:**

ICE APPLICATION DURATION: Ice takes TIME to conduct cold through the tissue layers. Research shows: SKIN temperature drops rapidly (within 5 minutes); SUBCUTANEOUS FAT insulates underlying tissues — thicker fat layer = more time needed; Tissue temperature at 1-2 cm depth: requires 20-30 minutes of ice application to achieve meaningful cooling. Most clinical protocols: 10-20 minutes for pain relief and superficial effects; 20-30 minutes for deeper tissue effects. PRACTICAL GUIDELINE: apply ice for 15-20 minutes to achieve optimal balance of therapeutic effect vs. frostbite risk. Never apply ice directly to skin (use a damp towel between ice and skin). Remove if any burning sensation, excessive numbness, or skin discoloration (white/blue). The intermittent protocol (20 on, 20 off) allows tissue to reheat and prevents frostbite in prolonged applications.

CARDIOPULMONARY PT

61. Incentive spirometry (IS) after thoracic/abdominal surgery is used to:

A. Strengthen the expiratory muscles

B. Maximize SUSTAINED MAXIMAL INSPIRATORY VOLUME — preventing post-operative atelectasis by encouraging slow, deep, sustained inspiration

C. Measure peak expiratory flow rate

D. Provide positive expiratory pressure

✓ Answer: B

💡 **Rationale & Explanation:**

Incentive spirometry (IS): a visual biofeedback device that measures and encourages SLOW DEEP INSPIRATION. The patient inhales slowly until a visual indicator (rising ball or column) reaches the target volume, then SUSTAINS the inspiration. Mechanism: sustained maximal inspiration recruits collapsed alveoli (atelectatic areas), maximizes functional residual capacity, improves lung compliance. Post-surgical use: after thoracic and abdominal surgery (sternotomy, pneumonectomy, bowel resection), patients guard against pain by taking shallow breaths → atelectasis → pneumonia. IS encourages deep breathing in a measurable, self-reinforcing way. Target: achieve >1 liter (or pre-operative baseline) per inhalation, hold for 3-5 seconds, 10 repetitions every 1-2 hours. TIMING: most effective if started PRE-OPERATIVELY (baseline established) and continued throughout hospitalization.

EXERCISE SCIENCE

62. The 'HIIT vs steady state' debate in physical therapy: for ELDERLY patients with multiple comorbidities, the SAFEST initial aerobic approach is:

A. High intensity interval training immediately

B. Low to moderate intensity CONTINUOUS aerobic exercise (e.g., walking) with gradual progression — monitoring vital signs throughout, starting at 40-50% HRR

C. Maximum effort sprint intervals

D. No aerobic exercise for elderly patients

✓ Answer: B

💡 **Rationale & Explanation:**

Elderly patients with comorbidities and aerobic training: safety first. START with LOW to MODERATE INTENSITY CONTINUOUS EXERCISE: 40-50% HRR (heart rate reserve); RPE 11-13 (fairly light to somewhat hard); walking, cycling, swimming; 10-20 minutes initially, progressing by 5 minutes every 1-2 weeks. MONITORING: HR, BP, SpO2, RPE before, during, and after every session. HIIT can be gradually introduced for appropriate, motivated elderly patients AFTER a baseline aerobic fitness is established — with careful patient selection and screening (stress test if indicated). Benefits of appropriate aerobic exercise in elderly: reduced cardiovascular mortality, improved glucose metabolism, maintained cognitive function, reduced fall risk (improved cardiovascular base for balance), reduced depression. The risk of NOT exercising outweighs the risks of appropriately dosed exercise in the vast majority of elderly patients.

├— PHYSICAL AGENTS

61. The 'effective radiating area' (ERA) of an ultrasound transducer matters clinically because:

A. Larger ERA is always better

B. A SMALLER ERA relative to total transducer face = uneven energy distribution; you must move the transducer slowly in overlapping circles to ensure adequate coverage of the treatment area

C. ERA has no clinical relevance

D. ERA determines frequency

✓ **Answer: B**

💡 **Rationale & Explanation:**

ERA (Effective Radiating Area): the portion of the transducer face that actually emits therapeutic US energy. If ERA is 5 cm^2 but you're treating a 15 cm^2 area: you must use OVERLAPPING CIRCLES technique, moving the transducer slowly (2-3 cm/s) to ensure all tissue receives adequate exposure. ERA also determines the SPATIAL AVERAGE INTENSITY (SAI): SAI = Total Power (W) / ERA (cm^2). Always use the ERA value to calculate appropriate intensity — not the total transducer face area. The BNR (Beam Nonuniformity Ratio) is related — it describes how uneven the energy is within the ERA: BNR ≥6:1 = poor quality beam with 'hot spots.' Both ERA and BNR should be checked before purchasing or using US equipment.

├— ELECTROTHERAPY

62. The 'polarity' of the active electrode in wound healing with HVPC matters because:

A. Polarity has no effect on wound healing

B. NEGATIVE POLARITY is used for INFECTED or NECROTIC wounds (attracts neutrophils and macrophages, bactericidal effects); POSITIVE POLARITY is switched to for CLEAN GRANULATING wounds (attracts fibroblasts and keratinocytes for epithelialization)

C. Always use positive polarity

D. Always use negative polarity

✓ **Answer: B**

💡 **Rationale & Explanation:**

HVPC wound healing polarity protocol: Phase 1 (INFECTED/NECROTIC wound): NEGATIVE ELECTRODE over the wound. Negative charge attracts: NEUTROPHILS (antimicrobial), MACROPHAGES (phagocytosis). Bactericidal effect (direct current negative polarity inhibits bacterial

growth). Duration: until wound is clean and free of necrotic tissue. Phase 2 (CLEAN, GRANULATING wound): Switch to POSITIVE ELECTRODE. Positive charge attracts: FIBROBLASTS (collagen production), KERATINOCYTES (epithelialization — covering the wound surface). Duration: until wound is epithelialized. Phase 3 (PLATEAU in healing): alternate polarity every few days to prevent adaptation. This protocol has FDA clearance and is used in wound care PT. Parameters: 100-150 V, 100 pps, 30-60 min/session, 5 days/week.

├─ EXERCISE SCIENCE

63. 'Variable resistance training' (using bands or cam-based machines) attempts to match:

A. A constant load throughout the movement

B. The STRENGTH CURVE of the muscle — increasing resistance where the muscle is STRONGEST (mid-range) and decreasing where it's weakest (end ranges), providing maximal stimulus throughout the entire ROM

C. A decreasing resistance throughout

D. Random resistance variations

✓ Answer: B

💡 Rationale & Explanation:

Variable resistance training: standard free weights provide CONSTANT resistance — but the muscle's strength is NOT constant through the range (length-tension relationship means force capacity varies). Variable resistance matches the MUSCLE'S NATURAL STRENGTH CURVE: RESISTANCE BANDS: resistance increases as the band stretches → this coincides with the portion of range where the muscle is stronger (inner to mid range becoming the end range demand). CAM-BASED MACHINES (Nautilus, Keiser): the eccentric cam changes the moment arm of the resistance throughout the range, increasing resistance at the strong point of the movement. Advantage: maximally challenges the muscle throughout the full range — avoiding the

'weakest point' limitation of constant resistance. Rehabilitation application: elastic resistance bands are ideal for shoulder rotator cuff exercises and early rehabilitation.

PHYSICAL AGENTS

64. Ultrasound is applied with a 'coupling agent' gel because:

A. It improves electrical conduction

B. US energy cannot pass through AIR — even a small air gap between the transducer and skin completely blocks US transmission; gel eliminates this air interface, ensuring optimal energy transfer into the tissue

C. It enhances thermal effects specifically

D. It reduces the intensity of the beam

✓ Answer: B

💡 **Rationale & Explanation:**

US coupling agent: ultrasound waves (mechanical vibrations) are COMPLETELY REFLECTED at an air-tissue interface — they cannot pass through even a small air gap. The coupling gel (water-based, acoustically matched to biological tissue) FILLS the space between the transducer face and the skin surface, eliminating the air interface. This allows maximum US energy transmission into the tissue.
ALTERNATIVES to direct gel contact: UNDERWATER TECHNIQUE — submerge the part in water (water is an excellent US medium); BLADDER TECHNIQUE — a water-filled balloon or bladder for irregular surfaces (face, calcaneus). Never apply US without coupling medium — 100% reflection at the air interface would heat the transducer face and damage it while delivering NO therapeutic benefit to the patient.

ELECTROTHERAPY

65. The 'H-wave therapy' device is different from conventional TENS in that:

A. It uses higher frequencies only

B. It uses a BIPHASIC, SINUSOIDAL WAVEFORM designed to activate both SENSORY and MOTOR NERVE fibers at lower amplitudes, claimed to improve circulation and provide analgesia

C. It only treats neuropathic pain

D. It uses direct current

✓ Answer: B

💡 **Rationale & Explanation:**

H-wave therapy: a specific type of electrotherapy using a biphasic, exponentially decaying waveform at two frequency settings — 2 Hz (deep muscle fiber stimulation) and 60 Hz (superficial analgesic). Claimed mechanisms: vasodilation and increased local circulation (similar to exercise-induced effects); analgesia via Gate control and endorphin release; reduction of edema via muscle pump effect. Used for: chronic pain, peripheral neuropathy (particularly diabetic), wound healing, lymphedema. Evidence base: growing but still limited compared to conventional TENS. PT practitioners should be familiar with emerging electrotherapy technologies even if they are not yet first-line interventions. Board examinations may include questions about newer modalities.

├— EXERCISE SCIENCE

66. The 'sport-specific warm-up' for a soccer player should include:

A. Passive static stretching of all muscles for 30 seconds each

B. DYNAMIC WARM-UP — general aerobic (light jog), dynamic stretching (leg swings, high knees), sport-specific movements (passing, dribbling at low intensity) — MIMICKING the demands of the sport

C. Complete rest before the game

D. Maximum intensity sprints immediately

✓ **Answer: B**

💡 **Rationale & Explanation:**

Evidence-based warm-up for sports: research shows that traditional STATIC stretching before exercise REDUCES muscle performance (strength and power) for up to 60 minutes post-stretching — it temporarily decreases muscle stiffness (which is needed for force generation). DYNAMIC WARM-UP is superior: 1) GENERAL AEROBIC warm-up: 5-10 min light jogging, cycling → raises muscle temperature; 2) DYNAMIC STRETCHING: controlled movements through full ROM (leg swings, arm circles, walking lunges, hip circles) → maintains muscle stiffness while improving mobility; 3) SPORT-SPECIFIC ACTIVITIES: progressively increasing in intensity to match the demands of the upcoming sport. Evidence: FIFA 11+ warm-up program (which is dynamic) reduces ACL injuries by ~50% in female football players. Static stretching: appropriate for cool-down (post-exercise flexibility maintenance), not pre-exercise performance.

├— CARDIOPULMONARY PT

67. The 'active cycle of breathing technique' (ACBT) for secretion clearance consists of:

A. Forced coughing only

B. BREATHING CONTROL (BC) + THORACIC EXPANSION EXERCISES (TEE) + FORCED EXPIRATION TECHNIQUE (FET/huffing) — repeated in cycles until secretions are cleared

C. Pursed-lip breathing only

D. Incentive spirometry only

✓ **Answer: B**

💡 **Rationale & Explanation:**

ACBT components: 1) BREATHING CONTROL (BC): gentle, relaxed tidal breathing using the lower chest — allows the patient to rest and recover between active phases; 2) THORACIC EXPANSION EXERCISES

(TEE): 3-5 deep breaths with 3-second inspiratory hold — maximizes inspiratory volume, opens collapsed alveoli, promotes collateral ventilation to move air behind mucus; 3) FORCED EXPIRATION TECHNIQUE (FET): 1-2 'huffs' — a forced expiration from mid-to-low lung volume with an OPEN GLOTTIS (unlike coughing which uses a closed glottis) — huffing moves secretions from small to large airways; 4) Repeat the cycle until secretions are mobilized and cleared. FET/huffing is GENTLER than coughing — less risk of bronchospasm and airway collapse. ACBT can be self-performed by patients — excellent for home use in CF, COPD, and post-surgical patients.

├— PHYSICAL AGENTS

68. The 'Photobiomodulation' dosage parameter most important for clinical efficacy is:

A. Wavelength only

B. ENERGY DENSITY (fluence) measured in J/cm² — the optimal therapeutic window varies by condition: too little = no effect; therapeutic window = biostimulation; too much (per Arndt-Schulz) = inhibition

C. Power only

D. Treatment duration alone

✓ Answer: B

💡 **Rationale & Explanation:**

LLLT/Photobiomodulation optimal dosing: ENERGY DENSITY (J/cm²) = Power (mW) × Time (seconds) / Area (cm²). The therapeutic window: Wound healing: 0.5-4 J/cm². Tendinopathy: 2-6 J/cm². Nerve regeneration: 1-4 J/cm². Pain relief: 1-8 J/cm²+. Too LOW (<0.5 J/cm²): no effect (below biostimulation threshold). THERAPEUTIC RANGE: biostimulation — cell activity enhanced. Too HIGH (>10+ J/cm² in most tissues): inhibitory effect (too much energy disrupts cellular homeostasis — Arndt-Schulz law). WAVELENGTH determines PENETRATION: 600-700 nm (red) = superficial (0.5-1 cm); 780-950 nm

(near-infrared) = deeper (1-3+ cm). In clinical practice: calculate the actual J/cm² delivered before each treatment to ensure therapeutic dosing.

EXERCISE SCIENCE

69. 'Core stability training' for low back pain should progress from:

A. Maximum load exercises immediately

B. INNER UNIT activation (TrA + multifidus + pelvic floor + diaphragm at low load) → neutral spine activation in stable positions → unstable surfaces → dynamic functional movements — matching the patient's tolerance and stage of recovery

C. Sit-ups and crunches first

D. Static plank only

✓ Answer: B

💡 **Rationale & Explanation:**

Core stability progression (Panjabi model): INNER UNIT: transversus abdominis (TrA), multifidus, pelvic floor, diaphragm — the deep stabilizers that provide ANTICIPATORY (feedforward) spinal stabilization. OUTER UNIT: global movers (erector spinae, obliques, rectus abdominis, quadratus lumborum). Progression: STAGE 1 (Inner unit activation): TrA hollowing (abdominal draw-in maneuver), multifidus cocontraction, at rest in lying — no load. STAGE 2: Stable surface, neutral spine — dead bugs, bird-dogs, bridges. STAGE 3: Unstable surfaces — balance boards, Swiss ball — challenges reactive stabilization. STAGE 4: Dynamic functional movements with load — deadlifts, squats, lifting tasks while maintaining spinal neutral. KEY: always within PAIN-FREE RANGE; progress only when adequate control at the current level is demonstrated. Never skip to Stage 4 with a patient who cannot yet activate their inner unit.

├— PHYSICAL AGENTS

70. The 'therapeutic window' for HYPERTHERMIA from thermal modalities is reached at which tissue temperature range?

A. 35-36°C (normal body temperature)

B. 40-45°C — therapeutic heating of tissue (increases extensibility, vasodilation, reduces spasm); above 45°C = thermal damage risk (protein denaturation, burns)

C. 50-60°C

D. 37-38°C

✓ Answer: B

💡 **Rationale & Explanation:**

Therapeutic temperature range: NORMAL tissue: ~36-37°C. THERMAL PHYSICAL THERAPY GOAL: 40-45°C in the target tissue. AT THIS RANGE: EXTENSIBILITY of collagen increases (optimal time to stretch is within this thermal window, within 3 minutes of achieving the target temperature); VASODILATION → increased blood flow → nutrient delivery; METABOLIC RATE INCREASES; MUSCLE SPASM REDUCES; PAIN GATE ACTIVATED. ABOVE 45°C: thermal DAMAGE begins — protein denaturation (enzymes, structural proteins), cell membrane disruption, burns (first-degree at ~48°C sustained). SAFETY GUIDELINE: always use adequate insulation (towels for hot packs), monitor patient's sensation and skin color every 5 minutes, never exceed 20-minute application. Patients with IMPAIRED SENSATION require particular caution — they cannot report burning until damage has occurred.

├— CARDIOPULMONARY PT

71. In the acute phase after myocardial infarction (MI), cardiac rehabilitation (Phase I) begins when:

A. Discharge from hospital

B. The patient is HEMODYNAMICALLY STABLE — typically within 24-48 hours of the uncomplicated MI — with low-level physical activity (seated exercises, short walks, ADL guidance), education, and risk factor counseling

C. 3 months after the MI

D. After cardiac catheterization only

✓ Answer: B

💡 **Rationale & Explanation:**

Cardiac rehab Phase I (inpatient): begins when: hemodynamically stable (HR <100 bpm, SBP 90-150 mmHg, no new or worsening ischemic symptoms, no significant arrhythmias). Content: LOW-LEVEL MOBILIZATION — sitting in chair, standing, short corridor walks (initially 3-5 minutes, 2x/day, progressing); PATIENT EDUCATION: risk factors, medications, warning signs; PSYCHOLOGICAL SUPPORT: anxiety and depression are common post-MI. Monitor: RPE, HR, BP, ECG during all activities. STOP if: chest pain, dyspnea at rest, significant ST change, new arrhythmia, SBP fall >10-20 mmHg. Target: patient discharged able to ambulate 60-100 meters, stair climb, and self-care independently. Phase II = outpatient supervised exercise (4-12 weeks). Phase III/IV = maintenance community exercise.

├— EXERCISE SCIENCE

72. 'Aquatic running' (deep water running) provides cardiovascular training that is equivalent to land running at approximately what metabolic intensity?

A. 50% of land running intensity

B. COMPARABLE to land running at the same perceived exertion — heart rate during deep water running is typically 10-17 BPM LOWER for the same VO2, due to the vagal effects of water immersion and hydrostatic pressure on cardiac chambers (Bainbridge reflex)

C. 200% of land running

D. Only 20% of land running

✓ **Answer: B**

💡 **Rationale & Explanation:**

Deep water running physiology: cardiovascular training effect is COMPARABLE to land running at similar perceived exertion. KEY DIFFERENCE: heart rate in water is approximately 10-17 BPM LOWER than land running at the same VO2 due to: HYDROSTATIC PRESSURE compresses peripheral veins → increases venous return → increases stroke volume (Starling mechanism) → the same cardiac output is achieved at a LOWER HR; DIVING RESPONSE (water around the head triggers vagal bradycardia); Supine-like position in water reduces hydrostatic gradient. CLINICAL IMPLICATION: when prescribing deep water running intensity, adjust the HR target downward by 10-17 BPM compared to land-based exercise HR targets. Alternatively, use RPE (3-5 on modified Borg CR10) rather than HR as the intensity guide in deep water exercise.

├— PHYSICAL AGENTS

73. Iontophoresis current density (mA/cm²) should not exceed which limit to prevent skin burns?

A. 0.01 mA/cm²

B. 0.5 mA/cm² — the maximum safe current density; exceeding this risks electrochemical burns (pH-induced burns from acid/base accumulation under the electrodes)

C. 5 mA/cm²

D. 10 mA/cm²

✓ **Answer: B**

💡 **Rationale & Explanation:**

Iontophoresis safety — current density limit: MAXIMUM SAFE CURRENT DENSITY = 0.5 mA/cm². Formula: Maximum Current (mA) = Electrode Area (cm²) × 0.5 mA/cm². Example: 4 cm² electrode × 0.5 =

maximum 2 mA safe current. EXCEEDING 0.5 mA/cm²: electrochemical reactions at the electrode-skin interface produce acids (anode) and bases (cathode) that accumulate under the small active electrode area → ELECTROCHEMICAL BURNS (deep, slow-healing wounds, possibly requiring skin grafting). These are particularly dangerous because: they may not be painful during the session (due to analgesia from the current); they develop over 24-48 hours post-treatment. SAFE PRACTICE: calculate maximum current before every iontophoresis treatment; use appropriate electrode size; start at low current and gradually increase; check skin before, during, and after treatment.

├─ EXERCISE SCIENCE

74. The 'SAID principle' applied to stretching means:

A. Stretch as hard as possible

B. For flexibility training, stretch the SPECIFIC muscles that are TIGHT for a given dysfunction — general stretching does not specifically address postural imbalances

C. Always stretch bilaterally

D. Stretch before every exercise

✓ Answer: B

💡 Rationale & Explanation:

SAID in flexibility: SPECIFIC ADAPTATION TO IMPOSED DEMAND applies to stretching: Stretching only produces lasting flexibility improvements in the SPECIFICALLY STRETCHED tissues. General yoga or stretching programs may improve overall flexibility but do not specifically address individual clinical flexibility deficits. For example: a patient with anterior pelvic tilt from iliopsoas and rectus femoris tightness + posterior pelvic tilt from hamstring tightness — specific stretches are prescribed for the SPECIFIC tight muscles. General 'stretch everything' programs may even worsen musculoskeletal imbalances by stretching already elongated structures (e.g., stretching the overstretched posterior neck extensors in a patient with forward head posture).

Clinical stretching programs should be: TARGETED to the specific tight tissues identified in the assessment, not generic.

CARDIOPULMONARY PT

75. In the assessment of COPD severity, the GOLD STAGING uses:

A. 6-minute walk distance only

B. POST-BRONCHODILATOR FEV1/FVC ratio AND FEV1 % predicted: GOLD 1 (mild, FEV1 ≥80%), GOLD 2 (moderate, FEV1 50-79%), GOLD 3 (severe, FEV1 30-49%), GOLD 4 (very severe, FEV1 <30%)

C. Peak expiratory flow rate only

D. CT scan findings only

✓ Answer: B

💡 **Rationale & Explanation:**

GOLD (Global Initiative for Chronic Obstructive Lung Disease) staging: DIAGNOSTIC CRITERION: post-bronchodilator FEV1/FVC <0.70. SEVERITY STAGING by FEV1% predicted: GOLD 1 (MILD): FEV1 ≥80% predicted — often asymptomatic; GOLD 2 (MODERATE): FEV1 50-79% — shortness of breath on exertion, often seeking medical attention; GOLD 3 (SEVERE): FEV1 30-49% — significant dyspnea, reduced exercise capacity, repeated exacerbations; GOLD 4 (VERY SEVERE): FEV1 <30% — severe chronic respiratory failure, quality of life impaired. The GOLD ABCD assessment also incorporates symptom burden (CAT score/mMRC) and exacerbation history. PT relevance: GOLD staging guides exercise intensity and expectations for pulmonary rehabilitation outcomes. GOLD 2-4 patients benefit most from pulmonary rehabilitation.

PHYSICAL AGENTS

76. The 'contra-lateral' (cross-body) effect of TENS for pain relief can occur because:

A. TENS has no contralateral effect

B. TENS activates DESCENDING PAIN INHIBITORY PATHWAYS from the brainstem (periaqueductal gray, raphe nuclei) that project BILATERALLY down the spinal cord — this central mechanism can reduce pain on BOTH sides

C. TENS current crosses to the other side

D. Counter-irritation only

✓ Answer: B

💡 Rationale & Explanation:

Contralateral TENS effects: while the direct gate control mechanism of TENS is segmental (within the treated dermatome), TENS also activates DESCENDING INHIBITORY PATHWAYS: the periaqueductal gray (PAG) in the midbrain and the raphe nuclei in the brainstem. These pathways release SEROTONIN and NORADRENALINE in the dorsal horn BILATERALLY. This means: TENS applied to one side can reduce pain on BOTH sides of the body (though less powerfully on the contralateral side). Clinical application: when the painful area cannot be directly accessed (open wound, cast, contralateral hemisphere stroke sensory change), applying TENS to the CONTRALATERAL mirror site can still provide some pain relief. Also explains the systemic pain-reducing effects sometimes seen with TENS beyond the immediate treatment area.

├— EXERCISE SCIENCE

77. The recommended exercise program for patients with HYPERTENSION (uncontrolled but not in hypertensive crisis) is:

A. High-intensity weightlifting with Valsalva

B. AEROBIC EXERCISE — moderate intensity (40-70% HRR or VO2R), 30-60 min/day, 5-7 days/week. Resistance training as supplement with

LIGHT TO MODERATE LOAD, high reps, NO VALSALVA. Avoid isometric exercises at high intensity

C. No exercise until BP is controlled

D. Only water-based exercise

✓ **Answer: B**

💡 **Rationale & Explanation:**

Hypertension exercise prescription (ACSM): AEROBIC EXERCISE is the primary mode: moderate intensity (40-70% HRR); 30-60 min/session; 5-7 days/week. Effect: reduces resting SBP by 5-8 mmHg (comparable to a single antihypertensive medication). RESISTANCE TRAINING: supplementary — light-moderate loads (60-80% 1RM), high reps (10-20), emphasize breathing out during exertion (no Valsalva). AVOID high-intensity isometrics: sustained isometric contractions (like heavy static holding or Valsalva-involving lifts) cause disproportionate BP spikes. MONITORING: stop exercise if SBP >220 mmHg or DBP >105 mmHg during exercise. ABSOLUTE CONTRAINDICATION: resting SBP >180 mmHg or DBP >110 mmHg — do not exercise until medically managed. Exercise is both prevention AND treatment for hypertension.

├— PHYSICAL AGENTS

78. 'Low dye taping' (LDT) for plantar fasciitis provides benefit by:

A. Strengthening the tibialis posterior

B. Supporting the medial longitudinal arch and REDUCING TENSION ON THE PLANTAR FASCIA during weight-bearing — thus providing immediate pain relief that allows exercise and functional rehabilitation to progress

C. Stretching the calf muscles

D. Compressing the Achilles tendon

✓ **Answer: B**

💡 **Rationale & Explanation:**

Low dye taping (LDT / plantar fascia taping): an adhesive tape technique applied across the plantar surface of the foot to support the MEDIAL LONGITUDINAL ARCH. Mechanism: 1) Reduces the PRONATION moment — the tape provides a physical constraint against foot pronation; 2) Reduces PLANTAR FASCIA TENSION — by maintaining the arch, less tensile strain is placed on the plantar fascial attachment at the calcaneus; 3) Immediate PAIN REDUCTION allows the patient to participate in therapeutic exercise without provocative pain. Evidence: LDT provides significant short-term (days to weeks) pain relief for plantar fasciitis — reduces the first-step pain in the morning. Combined with: calf stretching (gastrocnemius-soleus), intrinsic foot muscle strengthening, orthotics for longer-term arch support, gradual progressive loading (eccentric calf raises). LDT is a bridging intervention while longer-term strategies take effect.

├— CARDIOPULMONARY PT

79. Measurement of PEAK EXPIRATORY FLOW RATE (PEFR) using a peak flow meter is primarily used to monitor:

A. Exercise capacity in COPD

B. ASTHMA control — tracking day-to-day variability in airway obstruction; >20% diurnal variation or >20% drop from personal best = significant bronchoconstriction

C. Inspiratory muscle strength

D. Alveolar oxygen exchange

✓ Answer: B

💡 Rationale & Explanation:

Peak Flow monitoring in asthma: PEFR = the maximum speed of exhalation during a forced expiration — measured in L/min with a peak flow meter. Personal best (PB): measured when asthma is well-controlled and serves as the reference. TRAFFIC LIGHT SYSTEM: GREEN ZONE (80-100% PB) = good control, continue regular medications; YELLOW ZONE (50-79% PB) = caution, increase bronchodilator, may

need oral steroids; RED ZONE (<50% PB) = medical alert, urgent bronchodilator + physician contact. DIURNAL VARIATION >20% = ASTHMA diagnosis supportive. PT relevance: PT working with asthmatic patients should understand peak flow monitoring; exercise-induced bronchoconstriction (EIB) management; breathing techniques (pursed-lip, diaphragmatic); and recognition of worsening asthma requiring medical referral.

EXERCISE SCIENCE

80. The 'anaerobic threshold' (AT), also called 'ventilatory threshold' or 'lactate threshold,' occurs at approximately what percentage of VO2max in UNTRAINED individuals?

A. 20-30% VO2max

B. 50-65% VO2max — at higher intensities, aerobic metabolism can't meet demand, lactate accumulates, and ventilation increases disproportionately to VO2

C. 80-90% VO2max

D. 100% VO2max

✓ Answer: B

💡 Rationale & Explanation:

Anaerobic threshold in untrained individuals: occurs at approximately 50-65% of VO2max. TRAINED ENDURANCE ATHLETES: threshold at 70-85% VO2max or higher — training shifts the threshold rightward. SIGNIFICANCE: below the AT, exercise is entirely aerobic (sustainable for extended periods). ABOVE the AT: aerobic + anaerobic metabolism, lactate accumulates, fatigue develops quickly. The AT can be identified by: VENTILATORY METHOD (the point where VCO2 and VE increase disproportionately to VO2); LACTATE METHOD (blood lactate exceeds 2 mmol/L — first threshold, or 4 mmol/L — MLSS); RPE/TALK TEST (at AT, talking becomes difficult). Training INCREASES the AT: interval training and tempo training most effective. In cardiac rehab: exercise

prescribed BELOW the AT for safety; gradually increases toward AT as conditioning improves.

├— PHYSICAL AGENTS

61. The 'spatial average temporal average' (SATA) intensity in pulsed ultrasound is the most clinically relevant because:

A. It measures peak intensity

B. It represents the AVERAGE INTENSITY DELIVERED to the tissue over both space and area AND time — accounting for both the beam nonuniformity AND the duty cycle; it reflects the actual average thermal dose delivered to the tissue

C. It is always higher than SATP

D. It measures frequency

✓ Answer: B

💡 **Rationale & Explanation:**

US intensity terminology: SATA (Spatial Average Temporal Average) = the average intensity averaged over both the beam area AND the entire on-off time cycle. This is the TRUE measure of average energy delivered. SATP (Spatial Average Temporal Peak) = average over beam area, but only during ON time (ignores off periods). SPTP (Spatial Peak Temporal Peak) = the maximum intensity anywhere in the beam at any time. For PULSED US at 20% duty cycle: if set at 1.0 W/cm² (SATP), the SATA = 0.2 W/cm² (20% of SATP). Clinical relevance: SATA reflects TOTAL THERMAL AND NON-THERMAL DOSE. SPTP can be dangerously high with poor BNR transducers. Most clinical US machines display SATP or output power — understand that pulsed mode reduces the effective SATA proportionally to the duty cycle.

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62. The 'piezoelectric effect' in ultrasound transducers refers to:

A. Electrical conduction in tissue

B. The property of certain CRYSTALS (lead zirconate titanate) that convert ELECTRICAL ENERGY into MECHANICAL VIBRATIONS (and vice versa) — the basis of ultrasound generation

C. The heating of metal

D. The cooling effect of vibration

✓ Answer: B

💡 **Rationale & Explanation:**

Piezoelectric effect (James Curie, 1880): certain crystalline materials (quartz, lead zirconate titanate — PZT) generate an ELECTRIC CHARGE when mechanically DEFORMED (direct piezoelectric effect), and DEFORM MECHANICALLY when an electric voltage is applied (inverse piezoelectric effect). In therapeutic ultrasound: the electrical generator applies a high-frequency alternating voltage → the PZT crystal in the transducer vibrates at ultrasonic frequency → produces the ultrasonic waves. For DIAGNOSTIC ULTRASOUND (imaging): the same crystal both emits and receives ultrasound — emitting pulses and detecting reflected echoes. Understanding piezoelectricity helps explain: why the transducer must be kept moving (stationary transducer on bone = energy concentrated and may heat the crystal = damage); why proper maintenance of the crystal is important for consistent output.

⊢ EXERCISE SCIENCE

63. 'Isometric exercise' at the specific joint angle of testing transfers strength gains to:

A. All joint angles equally

B. PRIMARILY TO THE JOINT ANGLE TRAINED (within ±15-20° of the training angle) — isometric gains are angle-specific; training at multiple angles or through full range is more effective for general strength gains

C. No joint angles

D. All activities of daily living immediately

✓ **Answer: B**

💡 **Rationale & Explanation:**

Isometric specificity (angle-specific adaptation): isometric training at one angle produces strength gains PRIMARILY at that angle, with some spillover to adjacent angles (within ~15-20°). This is because isometric training does not activate the muscle uniformly through the range — it maximally activates at one specific length-tension relationship. CLINICAL IMPLICATIONS: 1) For PATELLAR TENDINOPATHY: isometric holds at 60° knee flexion provide analgesia and initial loading — but must progress to full-range dynamic exercise for complete rehabilitation; 2) For post-surgical immobilized joints: isometrics at the available angle are the starting point — progress to full range as mobility allows; 3) For PAIN INHIBITION: isometrics at pain-free angles can commence when through-range exercise is too painful. The angle-specificity phenomenon requires strategically selecting training angles to match the functional demands of the activity being trained.

⊢ ELECTROTHERAPY

64. The 'pulse rate' (frequency) in NMES for producing a SMOOTH TETANIC CONTRACTION is approximately:

A. 5-10 Hz (produces individual twitches)

B. 35-50 Hz — at this frequency, individual muscle twitches FUSE into a smooth, sustained tetanic contraction (muscle cannot relax between stimuli at this rate); lower frequencies produce unfused tetanus (tremor-like contractions)

C. 100-150 Hz (used for pain only)

D. 1-2 Hz

✓ **Answer: B**

💡 **Rationale & Explanation:**

NMES frequency for therapeutic muscle contraction: TWITCH: <15 Hz → individual twitches that do not fuse; visible as separate

contractions; not useful for functional strengthening. UNFUSED TETANUS: 15-30 Hz → twitches begin to merge but not completely smooth; still some 'tremor' quality. FUSED (SMOOTH) TETANUS: 35-50 Hz → twitches completely fused → smooth, controlled, useful contraction. This is the target for NMES-strengthening and FES. HIGH FREQUENCY (50-80 Hz): smooth tetanus but may accelerate fatigue. VERY HIGH (>100 Hz): pain predominant, less muscle contraction — more TENS-type effect. In clinical practice: NMES for strengthening uses 35-50 Hz; FES for gait (foot drop stimulators) uses 30-50 Hz to produce smooth dorsiflexion. Below 20 Hz = too tremorous for functional use; above 80 Hz = fatigue rapidly.

├— PHYSICAL AGENTS

65. The 'spasm-pain cycle' that thermotherapy interrupts involves:

A. Arterial disease causing ischemia

B. MUSCLE SPASM causing ISCHEMIA (reduced blood flow) → metabolite accumulation → PAIN → more muscle guarding → more spasm — heat application promotes VASODILATION breaking the cycle

C. Nerve compression causing pain

D. Bone deformity causing pain

✓ Answer: B

💡 **Rationale & Explanation:**

Spasm-pain cycle and heat: Muscle SPASM (from injury, poor posture, stress): reduces blood flow to the muscle (compressed capillaries); metabolic waste accumulates (lactic acid, CO2, bradykinin); these metabolites stimulate nociceptors → PAIN; pain causes PROTECTIVE MUSCLE GUARDING → more spasm → CYCLE PERPETUATES. HEAT BREAKS THE CYCLE: 1) VASODILATION: heat causes blood vessels to dilate → increased blood flow → washes out metabolites; 2) RAISES PAIN THRESHOLD: heat activates thermoreceptors → gate control → reduces pain signal; 3) REDUCES MOTOR NEURON EXCITABILITY: heat decreases the alpha motor neuron firing rate → less muscle tension.

This is why hot packs for acute and chronic musculoskeletal pain/spasm are so effective — they address multiple points in the pain-spasm cycle simultaneously. Combined with STRETCHING: heat makes the muscle more extensible AND reduces pain → optimal combination.

├─ EXERCISE SCIENCE

66. 'Training specificity' for swimming: a swimmer who trains exclusively with lap swimming will show:

A. Improved running economy

B. IMPROVED SWIMMING PERFORMANCE with limited carryover to land-based exercise — the cardiovascular adaptations (increased VO2max for swimming) and neuromuscular adaptations (stroke efficiency, muscular endurance for swimming muscles) are specific to the swimming mode

C. Equal improvement in all sports

D. No improvement in swimming

✓ Answer: B

💡 Rationale & Explanation:

Training specificity for swimming: CARDIOVASCULAR: swimming VO2max improves significantly with swim training; however, this does NOT fully transfer to running VO2max because: different muscle groups recruited; different postures; different biomechanical demands; some cardiovascular adaptations are muscle-group specific. NEUROMUSCULAR: stroke efficiency, pull mechanics, kick patterns, turn techniques, and breathing coordination improve specifically for swimming. CARRYOVER: general cardiovascular fitness (heart size, stroke volume) shows some carryover between modes; strength improvements in trained muscles show some functional carryover. PT IMPLICATION: when rehabbing a swimmer post-shoulder injury, introduce SWIMMING-SPECIFIC exercises early (pull mechanics with bands, kick training) — general shoulder strength alone does not fully

prepare them for swimming. Cross-training maintains cardiovascular fitness but does not replicate swimming-specific adaptations.

PHYSICAL AGENTS

67. The 'SensAtion' whirlpool temperature for burn rehabilitation should be:

A. 36-40°C (hot bath temperature)

B. TEPID (35-37°C) — warm but NOT hot — to prevent further thermal damage to already heat-sensitive burned skin; lower temperatures (32-35°C) may be used for extensive burns or hypersensitive areas

C. 20-25°C (cold water)

D. 42-45°C for maximum healing

✓ Answer: B

💡 Rationale & Explanation:

Whirlpool temperature for burn care: BURN WOUNDS: the skin's thermoregulatory ability is impaired in burns — water temperature that would be comfortable for normal skin may cause thermal injury in burn tissue. APPROPRIATE TEMPERATURES: mild-moderate burns: 35-37°C (warm, non-burning); extensive burns (>20% TBSA): 32-35°C (more conservative due to loss of thermoregulatory capacity); infected burns: slightly warmer (37-38°C) may be tolerated. NEVER HOT: temperatures >38-40°C can: re-injure healing tissue; cause pain (hyperalgesia in healed burn areas); increase metabolic demands in compromised patients. DURATION: 20-30 minutes for débridement; less for extensive burns. AGITATION: moderate turbine agitation for débridement; reduce agitation over freshly grafted areas. Whirlpool for burns also serves: pain relief, loosening dressings, débridement, exercise in water.

CARDIOPULMONARY PT

68. The 'ventilatory muscle training' (VMT) using a THRESHOLD DEVICE for COPD patients should be prescribed at:

A. 10% of MIP

B. 30-40% of maximal inspiratory pressure (MIP) — the evidence-based starting intensity; progress by 5-10% every 2-3 weeks as strength improves; effective range is 30-60% MIP

C. 80% MIP from the start

D. Any breathing intensity

✓ Answer: B

💡 **Rationale & Explanation:**

Inspiratory muscle training (IMT) dosage: THRESHOLD LOAD DEVICE: a spring-loaded valve that requires the patient to generate a minimum inspiratory pressure to open. Starting intensity: 30% of MIP (maximal inspiratory pressure). PROGRESSION: increase load by 5-10% every 2 weeks or when the patient can complete 30 repetitions without dyspnea at the current load. Target: 50-60% MIP for significant training effect. FREQUENCY: 30 repetitions, 2 times/day, 5-7 days/week, 8-12 weeks. EVIDENCE: reduces dyspnea, improves 6MWT, improves inspiratory muscle strength in COPD patients (particularly those with inspiratory muscle weakness — MIP < 60% predicted). COMBINED WITH PULMONARY REHAB: IMT + exercise training = superior outcomes to either alone. The inspiratory muscle weakness threshold (<60% MIP) identifies patients most likely to benefit from IMT as a targeted intervention.

├─ EXERCISE SCIENCE

69. The 'muscle mass' effect on resting metabolic rate (RMR): each kilogram of muscle mass burns approximately:

A. 0.5 kcal/day at rest

B. 13-15 KCAL PER KG PER DAY at rest — much more metabolically active than fat tissue (~4.5 kcal/kg/day); increased muscle mass from resistance training raises RMR, contributing to weight management

C. 100 kcal/day at rest

D. 50 kcal/day at rest

✓ Answer: B

💡 **Rationale & Explanation:**

Muscle metabolic activity: Skeletal muscle RMR: approximately 13-15 kcal/kg/day. Fat tissue RMR: approximately 4.5 kcal/kg/day. IMPLICATION: for every 1 kg of muscle mass gained through resistance training: RMR increases by ~13-15 kcal/day. After 12 weeks of progressive resistance training (typical increase of 1-3 kg lean mass): RMR increases by ~15-45 kcal/day. This explains why: resistance training is part of weight management programs (not just cardiovascular exercise); sarcopenia (age-related muscle loss — ~1% per year after age 30) progressively lowers RMR, contributing to age-related obesity; patients recovering from prolonged immobility (ICU, joint replacement recovery) have lower RMR from muscle atrophy. PT implication: RESISTANCE TRAINING increases muscle mass → increases RMR → metabolic benefit beyond just strength.

⊢ PHYSICAL AGENTS

70. The clinical endpoints indicating that ultrasound tissue temperature has reached the therapeutic range (40-45°C) are:

A. The patient reports burning pain

B. A DEEP ACHING SENSATION in the treatment area — a mild, dull, comfortable feeling of warmth deep in the tissue (not burning, not intense) — this indicates appropriate thermal elevation in the target tissue

C. No sensation at all

D. Skin redness at the surface

✓ **Answer: B**

💡 **Rationale & Explanation:**

Therapeutic US thermal endpoint — clinical feedback: HOW DOES THE PATIENT KNOW IT'S WORKING? With continuous ultrasound: the patient should report a gradual, DEEP ACHING SENSATION as tissue temperature rises into the therapeutic range (40-45°C). NOT: sharp pain (periosteum burning → bone heating → move the transducer); burning sensation (too hot, too stationary); NO sensation (continuous US should produce some warmth if correctly applied). The therapist monitors: consistent slow transducer movement (2-3 cm/s over 2× ERA); patient feedback every minute; skin color (should not become intensely red). After 5-7 minutes at therapeutic intensity: the thermal window is reached. STRETCH WITHIN 3 MINUTES of ending treatment for maximum extensibility benefit. If the patient feels nothing: check gel, transducer contact, ERA, intensity settings — US may not be being delivered effectively.

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71. The 'galvanic skin resistance' (GSR) and 'electrodermal response' are relevant to electrotherapy because:

A. They are used to measure intelligence

B. SKIN RESISTANCE VARIES WITH MOISTURE CONTENT — sweaty (low resistance) or dry (high resistance) skin significantly affects current delivery; gel or water is applied to reduce skin impedance to improve current penetration and reduce discomfort

C. They have no clinical relevance

D. They are tests of peripheral nerve function

✓ **Answer: B**

💡 **Rationale & Explanation:**

Skin resistance factors in electrotherapy: DRY SKIN: high resistance (impedance) — more voltage required to drive the same current through; poor current delivery; more surface heating at the skin. MOIST/SWEATY SKIN: low resistance — current passes easily. GEL ELECTRODES: provide an ionic medium between the electrode and skin that significantly reduces interfacial impedance, allowing current to

pass with less voltage. CLINICAL PRACTICE: skin preparation (cleaning with alcohol wipe) and using adequate gel ensures consistent, comfortable current delivery. Without gel: dry coupling → high impedance → potential for concentrated heating at high-impedance points → BURNS at skin contact points. Also: thick callus (hands, feet) = high local resistance → consider using increased gel, larger electrode, or water electrode for plantar/palmar surfaces.

├— EXERCISE SCIENCE

72. The 'cardiorespiratory training effect' requires exercise at a minimum of:

A. 40% of HRmax

B. 40-50% of VO2max (or HRR) — the minimum intensity threshold for improving cardiovascular fitness in most adults; below this intensity, cardiovascular adaptations are minimal; this threshold is LOWER for very deconditioned or older adults (20-30% VO2max may be sufficient initially)

C. 80% of HRmax always

D. No threshold — any exercise trains the heart

✓ Answer: B

💡 Rationale & Explanation:

Cardiorespiratory training threshold: the minimum exercise intensity to improve cardiovascular fitness varies by: INITIAL FITNESS LEVEL: sedentary/deconditioned adults: as low as 20-30% VO2max; average adults: 40-50% VO2max; trained athletes: 60-70% VO2max needed for further adaptation. CURRENT ACSM GUIDELINES: moderate intensity = 40-60% VO2R (VO2 reserve) or HRR for average adults. This is why: WALKING produces cardiovascular adaptations in sedentary people (walking at 3 mph = ~40-45% VO2max for deconditioned adults); but the same walking intensity has little cardiovascular benefit for trained athletes (too low relative to their capacity). In cardiac rehabilitation: start at 40-50% HRR and progress; in healthy adults: 60-75% HRR for

optimal cardiovascular adaptation; in frail elderly: even 30% HRR produces meaningful benefit. Always individualize the intensity prescription.

⊢ PHYSICAL AGENTS

73. The 'transcranial direct current stimulation' (tDCS) is an emerging PT adjunct that:

A. Delivers therapeutic current to muscles

B. APPLIES WEAK DC CURRENT (1-2 mA) through scalp electrodes to MODULATE CORTICAL EXCITABILITY — the ANODE increases excitability; the CATHODE decreases excitability; used in stroke, depression, chronic pain, and cognitive rehabilitation research

C. Replaces TENS for pain

D. Treats only vestibular disorders

✓ Answer: B

💡 Rationale & Explanation:

tDCS in rehabilitation research: a non-invasive brain stimulation technique. Two sponge electrodes on the scalp: ANODAL tDCS over the motor cortex: INCREASES neuronal firing threshold (enhances cortical excitability) → may improve motor function when combined with physical practice in stroke. CATHODAL tDCS: DECREASES cortical excitability — used to suppress the UNAFFECTED hemisphere in stroke (to reduce interhemispheric inhibition of the affected hemisphere). PARAMETERS: 1-2 mA; 20-30 minutes per session; multiple sessions (10-15) for cumulative effect. EVIDENCE: moderate — some RCTs show improved UE function post-stroke when tDCS combined with PT; mixed results for other conditions. SAFETY: generally well tolerated; mild scalp tingling; not clinically available routinely (still primarily research setting). PT should be aware of emerging adjunct technologies and their evidence base.

CARDIOPULMONARY PT

74. The 'step test' (Harvard Step Test / Chester Step Test) for cardiovascular fitness estimation works by:

A. Directly measuring VO2max

B. MEASURING HEART RATE RECOVERY after a standardized stepping protocol — the faster the HR recovers after exercise, the higher the cardiovascular fitness; submaximal HR during steady-state stepping can also estimate VO2max from prediction equations

C. Measuring lung function

D. Testing balance during stepping

✓ Answer: B

💡 Rationale & Explanation:

Submaximal step tests for fitness estimation: HARVARD STEP TEST (original): step up and down on a 50 cm bench for 5 minutes at 30 steps/minute; measure HR at 1-1.5-2 minutes post-exercise; calculate 'Physical Fitness Index' from HR recovery. CHESTER STEP TEST: 15 cm step, 5 stages of 3 minutes each at progressively faster stepping rates; measure HR at end of each stage; extrapolate to predicted HRmax; estimate VO2max from the relationship between stepping intensity and HR. RATIONALE: lower HR for the same exercise intensity = better cardiovascular fitness (higher stroke volume per beat = less HR needed). ADVANTAGES: no equipment beyond a step and HR monitor; safe for clinical populations; widely used in occupational health, cardiac screening, and community fitness programs. LIMITATIONS: step height and weight affect the absolute metabolic demand; anxiety and motivation affect HR.

EXERCISE SCIENCE

75. The 'progressive overload' principle means that to CONTINUE improving strength, training volume must be increased. For a beginner

starting a resistance training program, improvements are expected every:

A. 6-12 months

B. 1-2 WEEKS (neuromuscular adaptations dominate early — improved motor unit recruitment, inter-muscular coordination) with continued strength gains over months as hypertrophy develops

C. Daily

D. Only after 1 year

✓ Answer: B

💡 **Rationale & Explanation:**

Strength training adaptation timeline: BEGINNERS (first 2-8 weeks): RAPID STRENGTH GAINS from NEURAL ADAPTATIONS — improved motor unit recruitment, synchronization, reduced co-contraction of antagonists, better motor pattern. These gains occur WITHOUT significant muscle hypertrophy (no visible size change yet). Improvements can be measured weekly. INTERMEDIATE (2-6 months): hypertrophy begins to contribute; strength gains continue but at a slower rate. ADVANCED (6+ months): gains become smaller and require more strategic periodization. IMPLICATIONS: 1) Beginners should see measurable strength improvements every 1-2 weeks — if not, the program is not challenging enough; 2) Initial strength gains can be rapid even with relatively low loads; 3) Elderly beginners also experience significant strength gains (primarily neural initially) — don't assume elderly patients cannot improve strength; 4) Discontinuation of training ('detraining') reverses gains in the same order — neural adaptations lost first, then hypertrophy.

├— PHYSICAL AGENTS

76. Ultrasound over the 'gonads' (testes or ovaries) is absolutely contraindicated because:

A. It is painful

B. The US thermal and mechanical effects may cause chromosomal damage to rapidly dividing GERM CELLS or developing EMBRYO/FETUS — potentially causing mutations or developmental defects

C. It reduces testosterone

D. It increases estrogen

✓ Answer: B

💡 **Rationale & Explanation:**

US gonadal contraindication: the gonads (testes, ovaries) contain GERM CELLS — cells that eventually become sperm and eggs — and possibly an early fetus if the patient is pregnant. REASONS FOR ABSOLUTE CONTRAINDICATION: 1) THERMAL DAMAGE to germ cells: elevated temperature can denature DNA and proteins in dividing cells; 2) MUTAGENIC POTENTIAL: mechanical effects (cavitation, acoustic streaming) on rapidly dividing cells may cause DNA damage; 3) FETAL RISK: even early in pregnancy, a fetus is highly sensitive to thermal and mechanical US effects (therapeutic US is NOT the same as diagnostic obstetric US — diagnostic uses much lower intensities); 4) IRREVERSIBLE CONSEQUENCES: genetic damage can affect future offspring. For PREGNANT PATIENTS: also avoid US over the lower back, abdomen, and pelvis. These rules are absolute — no exception in clinical PT practice.

├─ CARDIOPULMONARY PT

77. In the 'ventilatory efficiency slope' (VE/VCO2 slope), a value above what threshold suggests poor prognosis in heart failure?

A. 20

B. 34-35 — a VE/VCO2 slope >34-35 during exercise testing indicates EXCESSIVE VENTILATION relative to CO2 output, suggesting ventilatory inefficiency, exercise intolerance, and POOR PROGNOSIS in heart failure patients

C. 50

D. 10

✓ **Answer: B**

💡 **Rationale & Explanation:**

VE/VCO2 slope in cardiopulmonary exercise testing (CPET): the ratio of VENTILATION to CO2 OUTPUT during incremental exercise. In healthy individuals: ~24-30 (efficient ventilation). In HEART FAILURE: elevated due to: ventilation-perfusion mismatch; increased physiological dead space; heightened chemoreceptor sensitivity; early anaerobic threshold. PROGNOSTIC THRESHOLDS: >34 = moderately abnormal; >45 = severely abnormal; associated with poor prognosis (increased mortality risk). Clinical use in cardiac rehabilitation: patients with high VE/VCO2 slopes require: lower exercise intensities; close monitoring; may benefit from specific ventilatory training. CPET (using expired gas analysis) is increasingly used in advanced cardiac rehabilitation programs and in selecting patients for heart transplantation (VO2max <10-12 mL/kg/min AND high VE/VCO2 slope = strongest indicators for transplant candidacy).

├─ EXERCISE SCIENCE

78. 'Hypertrophy training' (bodybuilding type) is distinguished from 'strength training' primarily by:

A. Using heavier weights

B. HIGHER VOLUME with MODERATE LOADS (6-12 reps, 67-85% 1RM, 3-4 sets, 60-90 second rest) creating maximum metabolic stress and muscle damage — the primary drivers of hypertrophy; strength training uses lower reps (1-5), heavier loads (>85% 1RM), longer rest, training the NERVOUS SYSTEM more than the muscle

C. Using machines vs. free weights

D. The gender of the participant

✓ **Answer: B**

💡 **Rationale & Explanation:**

Hypertrophy vs. strength training parameters: HYPERTROPHY (sarcoplasmic + myofibrillar): 6-12 reps; 67-85% 1RM; 3-4+ sets; 60-90 second rest; total volume (sets × reps × load) maximized; metabolic fatigue and mechanical tension both important. STRENGTH (primarily neural): 1-5 reps; 85-100% 1RM; 3-5 sets; 2-5 minute rest (full neural recovery between sets); maximal effort; neural adaptations (recruitment, rate coding, synchronization) predominate over hypertrophy. POWER (rate of force development): 3-6 reps; 30-70% 1RM; explosive execution; long rest. In PT: hypertrophy training is important for: patients needing to rebuild muscle mass (post-surgery, sarcopenia); improving body composition; occupational rehabilitation needing muscle bulk. Strength training is important for: athletes; tasks requiring maximum force production; power generation.

├─ PHYSICAL AGENTS

79. The 'contraindications' specific to INTERFERENTIAL CURRENT (IFC) versus TENS include:

A. IFC is more dangerous than TENS

B. IFC uses 4-electrode QUADRIPOLAR placement — special attention to the CURRENT CROSSING THE THORAX (transcardiac placement) is needed; IFC current paths cross in the tissue and the intersecting currents could travel through the cardiac region if electrodes are placed on the trunk bilaterally

C. TENS cannot be used on the trunk

D. Both are identical in contraindications

✓ Answer: B

💡 **Rationale & Explanation:**

IFC-specific considerations: IFC's 4-electrode placement creates a VECTOR FIELD in the tissue — the two medium-frequency currents cross at a specific location. When electrodes are placed on the TRUNK: the intersecting current paths may potentially pass through the cardiac region, creating risk for pacemaker interference or cardiac arrhythmia.

SAFE TRUNK PLACEMENT: ensure the vector intersection is NOT through the heart; for chest wall pain, use electrodes on the same side (ipsilateral placement) rather than across the chest. For BILATERAL PLACEMENT on the lower limbs: safe because currents cross in the legs, not the thorax. The same pacemaker contraindication applies to IFC as TENS (in fact, IFC may be more concerning due to the transcardiac potential with bilateral trunk electrode placement). Always consider the current pathway when placing IFC electrodes.

├— CARDIOPULMONARY PT

80. 'Ventilation perfusion mismatch' (V/Q mismatch) in pulmonary conditions leads to:

A. Improved oxygenation

B. HYPOXEMIA — areas of high ventilation but low perfusion (dead space) or low ventilation but good perfusion (shunt) result in poor gas exchange efficiency; the SpO2 and PaO2 fall even while the patient breathes normally

C. Increased CO2 only

D. Better exercise capacity

✓ Answer: B

💡 Rationale & Explanation:

V/Q mismatch and hypoxemia: normal V/Q ratio = 0.8 (slightly more ventilation than perfusion). DEAD SPACE (V/Q > normal): high ventilation but poor perfusion (e.g., pulmonary embolism — ventilated but occluded vessels): CO2 may be low (blown off by ventilation) but O2 is not efficiently extracted (no blood to pick it up in that area). SHUNT (V/Q < normal): blood flows past poorly ventilated alveoli (e.g., pneumonia — consolidated alveoli with no air, atelectasis, ARDS): blood bypasses gas exchange → desaturated blood mixes with oxygenated blood → HYPOXEMIA. Most clinical pulmonary disease involves V/Q mismatch. RESPONSE TO SUPPLEMENTAL O2: dead space hypoxemia responds well to O2 (increases alveolar O2 in ventilated

areas); shunt hypoxemia responds POORLY to O2 (blood bypasses ventilated areas regardless). PT: positioning (prone positioning in ARDS improves V/Q matching), early mobilization, breathing techniques.

EXERCISE SCIENCE

81. The 'ACSM pre-participation physical activity screening' (PPAS) recommends which individuals should obtain medical clearance before starting MODERATE-INTENSITY exercise?

A. All adults regardless of health

B. Only those with KNOWN CARDIOVASCULAR, METABOLIC, OR RENAL DISEASE who are not currently ACTIVE — asymptomatic individuals without these conditions do not need medical clearance to start moderate-intensity exercise

C. Everyone over 40 years old

D. Professional athletes only

✓ Answer: B

💡 **Rationale & Explanation:**

ACSM Pre-Participation Screening (2015 update): SIMPLIFIED 3-step approach: 1) Does the individual have KNOWN CVD, metabolic, or renal disease OR SIGNS/SYMPTOMS of these conditions? 2) What is their CURRENT PHYSICAL ACTIVITY LEVEL? 3) What is the DESIRED EXERCISE INTENSITY? MEDICAL CLEARANCE RECOMMENDED: previously inactive individuals with known CVD/metabolic/renal disease wanting to start VIGOROUS-INTENSITY exercise; symptomatic individuals regardless of activity level. NOT REQUIRED: asymptomatic individuals (regardless of risk factors) starting moderate-intensity exercise; currently active asymptomatic individuals wanting to continue at any intensity. KEY CHANGE from old guidelines: routine medical clearance for ALL adults was eliminated — it was a BARRIER to exercise participation without significant safety benefit for low-risk moderate-intensity exercisers. This guideline supports PT practice of

prescribing moderate exercise without requiring physician clearance for most healthy adults.

├— PHYSICAL AGENTS

82. The 'safety distance' recommendation between a pacemaker and the active electrode of a TENS or NMES unit is:

A. There is no safe distance — ABSOLUTE CONTRAINDICATION for TENS over pacemakers

B. At minimum 15 cm from the pacemaker device AND not placing electrodes in a transcardiac configuration — some modern DEMAND-TYPE pacemakers are resistant to TENS interference but the risk is not zero; TRANSCUTANEOUS ELECTRICAL STIMULATION near pacemakers requires cardiologist consultation

C. TENS is safe within 5 cm of pacemakers

D. No restrictions — pacemakers are designed to ignore TENS

✓ Answer: B

💡 **Rationale & Explanation:**

TENS/NMES and pacemakers: the standard PT teaching: TRANSCARDIAC PLACEMENT = ABSOLUTE CONTRAINDICATION (electrodes on chest crossing the heart = electrical current path could interfere with pacemaker sensing, potentially triggering inappropriate pacing or inhibiting pacing). NEAR THE PACEMAKER DEVICE: also traditionally contraindicated (current might reprogram or damage the pacemaker). MODERN PACEMAKERS: many modern DEMAND-TYPE pacemakers have filters that reduce but may not eliminate TENS interference. CURRENT RECOMMENDATION: AVOID TENS near pacemakers unless there has been specific cardiologist consultation and pacemaker testing with the proposed TENS device. The 'safe distance of 15 cm' guideline is a minimum precaution from some manufacturers — but cardiologist clearance is the appropriate standard. In practice: the safest approach is to avoid TENS/NMES in pacemaker patients until cleared by cardiology.

83. The 'thermal dose' in heat therapy is determined by:

A. The equipment brand only

B. TEMPERATURE × TIME — the higher the temperature and the longer the duration, the greater the thermal dose delivered; clinical safety requires balancing therapeutic thermal elevation (40-45°C in target tissue) against burn risk (>45°C)

C. Only the type of modality

D. Patient body weight

✓ Answer: B

💡 **Rationale & Explanation:**

Thermal dose (time-temperature relationship): THERMAL EFFECTS: the higher the temperature in the target tissue AND the longer it is maintained above the therapeutic threshold (40°C), the greater the biological effect (extensibility, vasodilation, metabolic rate change). BURN THRESHOLD: tissue damage begins at >45°C sustained for more than a few minutes. HOT PACKS (68-80°C hot water): wrapped in 6-8 layers of toweling to reduce surface temperature to ~38-42°C on the skin; 15-20 minute application. PARAFFIN: at 52-54°C but low conductivity → slow heat transfer → safe despite higher temperature. PHYSIOTHERAPY PRINCIPLE: the minimum thermal dose that achieves the therapeutic goal is preferred (Arndt-Schulz law applied to heat). Patients with DIABETES, PERIPHERAL VASCULAR DISEASE, IMPAIRED SENSATION, and VERY THIN SKIN require LOWER temperatures and more frequent skin checks — their threshold for thermal injury is lower.

ELECTROTHERAPY

84. The 'frequency' of TENS current in Hz is selected based on:

A. Patient preference only

B. DESIRED NEUROPHYSIOLOGICAL MECHANISM: HIGH FREQUENCY (80-150 Hz) → GATE CONTROL (fast but short-duration analgesia); LOW

FREQUENCY (1-4 Hz) → OPIOID/ENDORPHIN RELEASE (slower onset but longer-lasting analgesia); MID-RANGE (approximately 10-50 Hz) → mixed effects

C. The patient's diagnosis alone

D. Electrode size

✓ Answer: B

💡 **Rationale & Explanation:**

TENS frequency selection clinical rationale: CONVENTIONAL TENS (HIGH FREQ 80-150 Hz, LOW INTENSITY): activates large-diameter A-beta sensory fibers → spinal dorsal horn gate control → RAPID analgesia (within minutes); SHORT DURATION (60-90 minutes after TENS is removed, analgesia fades); useful for acute pain, during activities, for immediate pre-exercise pain relief. ACUPUNCTURE-LIKE TENS (LOW FREQ 1-4 Hz, HIGH INTENSITY — at motor threshold, produces muscle twitches): activates A-delta fibers + activates descending inhibitory pathways via enkephalin/beta-endorphin release; SLOWER ONSET (20-30 minutes); LONGER DURATION (2-6 hours post-TENS); useful for chronic pain; naloxone (opioid antagonist) reverses the analgesia confirming the opioid mechanism. BURST TENS: combines both — high-frequency bursts (80-100 Hz within burst) delivered at low burst rate (2-4 bursts/second) → combines gate control and opioid effects.

⊢ PHYSICAL AGENTS

85. The 'inverse square law' for light/radiation-based treatments (infrared, laser) states:

A. Intensity increases with distance

B. INTENSITY DECREASES WITH THE SQUARE OF THE DISTANCE — doubling the distance from the source reduces intensity to one-quarter; for infrared lamps: doubling the distance reduces heat intensity to 25% of original

C. Intensity is constant regardless of distance

D. Distance does not affect laser

✓ **Answer: B**

💡 **Rationale & Explanation:**

Inverse square law: I ∝ 1/d². If distance is DOUBLED (2×): I = 1/(2²) = 1/4 (25% of original intensity). If distance TRIPLED: I = 1/9 (11%). CLINICAL APPLICATIONS: INFRARED LAMPS: precise positioning is critical — small changes in lamp-to-skin distance dramatically change the thermal dose; standard recommendation: 45-60 cm from the skin. LASER: also follows inverse square law for diverging beams; contact or very short distance application maintains energy density. PRACTICAL: always measure and document the distance when using infrared or laser, to ensure reproducible treatments and prevent burns from inadvertent distance reduction. The inverse square law explains why bringing an infrared lamp closer suddenly increases treatment intensity dramatically — a common cause of burns when the patient shifts position or the therapist moves the lamp without recalculating the dose.

├─ EXERCISE SCIENCE

86. The '1 Repetition Maximum' (1RM) test measures:

A. The maximum number of reps in 30 seconds

B. The MAXIMUM WEIGHT a person can lift for exactly ONE complete repetition with proper form — the gold standard for measuring muscular strength; used to calculate training intensities (e.g., 70% 1RM for hypertrophy)

C. Aerobic capacity

D. Flexibility

✓ **Answer: B**

💡 **Rationale & Explanation:**

1RM testing: DEFINITION: the heaviest load that can be lifted once through the full range of motion with correct technique — any heavier = failure. PROTOCOL: warm-up; start at 50-60% estimated 1RM; progressive increases (5-10%) with 3-5 min rest between attempts; usually achieved within 3-5 attempts. ESTIMATED 1RM: from submaximal testing (predict 1RM from reps-to-failure at a submaximal load) — safer in clinical settings. TRAINING PERCENTAGES: <30% 1RM = endurance; 30-60% = muscular endurance; 60-80% = hypertrophy; 80-90% = strength; 90-100% = maximal strength/power. CLINICAL USE: isokinetic testing provides more clinically applicable strength data for rehabilitation (measures through range, bilateral comparison, H:Q ratio); 1RM is more commonly used in sport conditioning and occupational rehabilitation. In PT: estimated 1RM from 10RM testing is safer and practical — 10RM weight ÷ 0.75 ≈ 1RM estimate.

├— PHYSICAL AGENTS

87. 'Fluidized Bed' therapy (FluiTherapy) differs from whirlpool in that:

A. It is the same as whirlpool

B. It uses HEATED FINE CELLULOSE PARTICLES suspended by warm air instead of water — providing dry heat, sensory desensitization, and the ability to EXERCISE THE LIMB WITHIN THE TREATMENT simultaneously; no infection control concerns of water re-use

C. It is used for full body immersion

D. It provides cold therapy

✓ Answer: B

💡 **Rationale & Explanation:**

Fluidotherapy differences from whirlpool: FLUIDOTHERAPY: heated air + cellulose particles (corn cob particles); semi-liquid consistency; temperature 38-46°C; provides SENSORY DESENSITIZATION (the moving particles provide continuous tactile input — excellent for CRPS hypersensitivity); allows ACTIVE EXERCISE during treatment (patient can squeeze, open, flex the hand/foot within the unit); DRY — no

infection concerns; NO WOUND DEBRIDEMENT capability. WHIRLPOOL: water + agitators; provides MOIST HEAT + DÉBRIDEMENT (turbulence loosens necrotic tissue); temperature 33-40°C for most conditions; INFECTION RISK (waterborne bacteria, cross-contamination between patients); cannot exercise within the tank easily. INDICATIONS for Fluidotherapy: CRPS (desensitization priority), hand/foot post-cast rehabilitation, arthritis pain, peripheral neuropathy desensitization. INDICATIONS for whirlpool: burn care, wound débridement, wound irrigation.

├─ EXERCISE SCIENCE

88. The 'progressive resistance principle' (DeLorme method) for rehabilitation uses:

A. Static load only

B. THREE SETS progressively approaching the 10RM: Set 1 = 50% of 10RM (warm-up); Set 2 = 75% of 10RM; Set 3 = 100% of 10RM (full challenge); the 10RM is updated each session as strength improves

C. Random loads each session

D. Maximum load from the first set

✓ Answer: B

💡 Rationale & Explanation:

DeLorme method (1948): an early but foundational resistance training protocol for rehabilitation. PROTOCOL: determine the 10RM (maximum weight for exactly 10 reps); Set 1: 50% × 10RM × 10 reps (warm-up, blood flow, familiarization); Set 2: 75% × 10RM × 10 reps (moderate challenge); Set 3: 100% × 10RM × 10 reps (full therapeutic challenge). UPDATE: reassess 10RM regularly and increase load when 10 reps at the current weight become easy (progressive overload). OXFORD METHOD (reverse progression): starts at 100% × 10RM, then reduces — thought to reduce fatigue for weakened muscles. CLINICAL USE: DeLorme is widely taught in PT programs as the foundational progressive resistance training method; it has stood the test of time for

general rehabilitation strength training. Modern modifications: adjust volume (sets × reps), rest periods, and specificity based on the patient's goals and stage of rehabilitation.

├─ CARDIOPULMONARY PT

89. The 'sit-to-stand test' as a CARDIORESPIRATORY fitness test uses which measurement?

A. Number of STS in 1 minute

B. The FIVE-TIMES-SIT-TO-STAND (5×STS) TEST: time to complete 5 stands from a chair — normal healthy adults <15 seconds; >15-20 seconds = reduced lower extremity function and increased fall risk — primarily a functional mobility test, though it has some correlation with VO2 in frail elderly

C. VO2 directly

D. Heart rate only

✓ Answer: B

💡 **Rationale & Explanation:**

Five-Times Sit-To-Stand (5×STS) test: PROCEDURE: patient sits in a standard chair (seat height ~43 cm, no arm rests used). Perform 5 complete sit-to-stand transitions as QUICKLY AS POSSIBLE. TIME recorded from 'go' to final standing position. NORMATIVE VALUES (adults): 60-69 years: <11.4s (men), <12.0s (women); 70-79 years: <13.5s; 80+ years: <17.3s. CLINICAL INTERPRETATION: <10s = good functional leg strength (young-middle aged); 10-15s = moderate; >15s = below normal, increased fall risk; >16.7s = significantly impaired in community-dwelling elderly. RELIABILITY: excellent ICC (>0.85). VALIDITY: correlates with: knee extensor strength, balance, walking speed, fall risk, functional independence. ADVANTAGE over 30-sec chair stand: standardized to 5 reps; more sensitive to change in less-impaired populations. Used in: post-surgical rehabilitation, cardiac rehab, stroke, PD, MS, geriatric screening.

PHYSICAL AGENTS

90. 'Topical agents' used in conjunction with IASTM (instrument-assisted soft tissue mobilization) include:

A. Electrolyte gel only

B. EMOLLIENTS AND LOTIONS (that reduce skin friction while providing adequate tissue grip for the instrument) — not pharmaceutical topicals; the medium must allow the instrument to move along the tissue surface while detecting texture changes in the underlying soft tissue

C. Ice packs simultaneously

D. Topical NSAIDs always

✓ Answer: B

💡 **Rationale & Explanation:**

IASTM coupling medium: the INSTRUMENT must be able to glide along the skin surface while the therapist detects the underlying tissue texture (normal vs. fibrotic). TOO MUCH LUBRICANT (regular massage oil): the instrument slides too freely → no tissue texture detection → poor therapeutic technique. TOO LITTLE: friction burn and skin irritation. APPROPRIATE MEDIUM: emollients/lotions (such as the Graston Technique emollient, or commercial water-based lotions) that provide: adequate glide (no friction burns) while allowing the instrument to 'feel' the resistance of restricted connective tissue below the skin. GRAIN TEST: after IASTM, the treated area typically shows PETECHIAE (small red dots from capillary rupture from instrument pressure) — this is expected and indicates effective treatment of restricted tissue. PATIENT EDUCATION: the petechiae resolve in 24-48 hours; normal soreness for 1-2 days post-treatment. If excessive bruising or pain: too much pressure was applied.

EXERCISE SCIENCE

91. The 'energy systems' during a 400-meter sprint (approximately 45-60 seconds) draw primarily from:

A. Purely aerobic

B. A COMBINATION of ALL THREE energy systems: ATP-PCr (creatine phosphate system, explosive initial 5-10 seconds), ANAEROBIC GLYCOLYSIS (lactic acid system, dominant from 5-30 seconds, produces large amounts of lactate), and AEROBIC OXIDATIVE PHOSPHORYLATION (contributes increasingly after 30 seconds) — the 400m is uniquely taxing because of this 'all three systems at high intensity' demand

C. Pure glycolysis only

D. Only the ATP-PCr system

✓ Answer: B

💡 **Rationale & Explanation:**

Energy system contribution by duration (approximate): ATP-PCr system: dominates for 0-10 seconds (pure power — 100m sprint, throwing, jumping); ANAEROBIC GLYCOLYSIS: dominates 10-120 seconds (400m, 800m, boxing round); AEROBIC: dominates beyond 2 minutes (distance running, cycling, swimming). 400M SPRINT (45-60 seconds): ALL THREE SYSTEMS are working hard simultaneously: ATP-PCr provides the explosive start; anaerobic glycolysis generates the bulk of energy (producing high blood lactate, explaining the severe fatigue); aerobic metabolism increases progressively and contributes ~30-40% by the finish. This is why 400m runners experience extreme metabolic fatigue (high lactate + near-maximal VO2) — unlike pure sprinters (all ATP-PCr) or distance runners (all aerobic). Relevant for sport-specific conditioning: 400m athletes train all three energy systems. In PT: the energy system model guides exercise intensity and duration prescription for sports rehabilitation and return-to-sport programs.

⊢ PHYSICAL AGENTS

92. The 'therapeutic window' for US-mediated phonophoresis absorption is approximately:

A. 0-2 minutes

B. 15-30 MINUTES POST-APPLICATION — the disruption of the skin barrier from US application persists for 30-60 minutes; applying the topical drug WITHIN this window significantly increases percutaneous absorption compared to non-US-treated skin

C. 24 hours only

D. Immediate (0 seconds)

✓ Answer: B

💡 **Rationale & Explanation:**

Phonophoresis timing for optimal drug absorption: the MECHANISM of phonophoresis is that US temporarily disrupts the STRATUM CORNEUM's lipid bilayer (the primary skin barrier), increasing permeability. This disruption PERSISTS for approximately 30-60 minutes after US application. Therefore: optimal drug absorption occurs when the topical drug is applied to the skin DURING US application (sonophoresis — most effective) OR WITHIN 15-30 MINUTES AFTER US. TECHNIQUE: apply the drug-containing cream/gel as the coupling medium during US treatment (direct phonophoresis), OR apply US first (without drug) to disrupt the barrier, then immediately apply the drug topically. DRUG REQUIREMENTS: the drug must be formulated as a topical (cream, gel, ointment); must be compatible with US transmission (some drugs interfere with coupling). MOST COMMONLY USED: hydrocortisone cream (anti-inflammatory), diclofenac gel (NSAID), lidocaine (local anesthetic).

├— CARDIOPULMONARY PT

93. The 'exertional hypotension' (drop in systolic BP of >10-20 mmHg during exercise) is a RED FLAG because:

A. It is a normal physiological response

B. It indicates CARDIOVASCULAR COMPROMISE — the heart cannot maintain adequate cardiac output to meet exercise demand; possible causes: severe aortic stenosis, hypertrophic cardiomyopathy, left ventricular dysfunction, severe coronary artery disease — STOP EXERCISE IMMEDIATELY

C. It means the patient is fit

D. It only occurs in hypertensive patients

✓ Answer: B

💡 **Rationale & Explanation:**

Exertional hypotension: NORMAL EXERCISE BP RESPONSE: systolic BP RISES progressively with increasing exercise intensity; diastolic BP remains stable or decreases slightly (peripheral vasodilation). ABNORMAL: systolic BP FALLS >10-20 mmHg below resting level during exercise. Mechanism: failure of cardiac output to keep pace with the increased demand + vasodilated peripheral vessels = BP drops. CAUSES: severe AORTIC STENOSIS (fixed obstruction → CO cannot increase with demand); HYPERTROPHIC OBSTRUCTIVE CARDIOMYOPATHY (HOCM); ISCHEMIC LV dysfunction (exercise-induced ischemia → acute LV failure); severe MITRAL VALVE REGURGITATION; advanced CARDIOMYOPATHY. ACTION: STOP EXERCISE IMMEDIATELY; help patient to a seated or supine position; monitor vital signs; call for medical assistance; do not leave the patient alone. Document and report to the referring physician. This symptom is a CONTRAINDICATION to continued exercise until cardiological clearance. Do NOT confuse with ORTHOSTATIC hypotension (occurs with position change, not during exercise).

├— EXERCISE SCIENCE

94. 'Muscle memory' (motor engrams) in rehabilitation refers to:

A. Muscle tissue storing information

B. The long-term storage of MOTOR PROGRAMS in the cerebellum, basal ganglia, and motor cortex — allowing previously learned movement patterns to be re-acquired faster than originally learned, even after long periods of inactivity or injury

C. Random muscle contractions

D. Proprioceptive input only

✓ Answer: B

💡 **Rationale & Explanation:**

Motor engrams and muscle memory: repetitive practice of a movement creates an engram — a stored motor program in the neural circuits (basal ganglia, cerebellum, supplementary motor area). After injury, surgery, or prolonged inactivity: the ENGRAM persists even when the muscles weaken or the limb is immobilized. When rehabilitation begins: re-acquiring the movement is FASTER than the original learning (because the engram is still there, even if dormant). Evidence: athletes returning from injury re-learn sport skills faster than when they first learned them. CLINICAL IMPLICATIONS: DO NOT restart from zero — the patient 'remembers' how to walk, throw, etc.; early task-specific practice REACTIVATES the stored motor program faster than pure muscle strengthening alone; high REPETITION is still needed to restore normal motor program precision after neural disruption (stroke, TBI). This is part of the neuroplasticity evidence base for why TASK-SPECIFIC PRACTICE (not just strengthening) is essential in neurological and musculoskeletal rehabilitation.

⊢ PHYSICAL AGENTS

95. The 'duty cycle' of 20% in pulsed ultrasound means:

A. The ultrasound is on 80% of the time

B. The ultrasound is ON for 20% of the PULSE CYCLE and OFF for 80% — delivering only 20% of the thermal dose of equivalent continuous US at the same intensity setting; predominantly produces NON-THERMAL (mechanical) effects

C. The frequency is 20 Hz

D. The intensity is reduced by 20%

✓ Answer: B

💡 Rationale & Explanation:

Duty cycle 20%: if the pulse duration is 2 ms and the pulse period is 10 ms: ON time = 2 ms; OFF time = 8 ms; Duty cycle = 2/(2+8) = 20%. THERMAL EFFECTS: a 20% duty cycle delivers only 20% of the thermal energy of continuous US → tissue temperature increases are minimal → primarily NON-THERMAL effects predominate (acoustic streaming, stable cavitation). CLINICAL SELECTION: ACUTE INJURY: pulsed (20% duty cycle) → non-thermal effects → stimulates healing without heating potentially inflamed tissue; CHRONIC CONDITION NEEDING DEEP HEATING: continuous or 50% duty cycle → thermal effects predominate. PRACTICAL EXAMPLE: if setting continuous US at 1.0 W/cm² produces a temperature rise of 4°C, then 20% pulsed at 1.0 W/cm² produces only ~0.8°C rise (20% of the thermal dose). This means for equivalent heating you'd need to increase SATP intensity when using pulsed mode — but the goal of pulsed mode is usually NOT heating.

├— CARDIOPULMONARY PT

96. Cardiopulmonary Resuscitation (CPR) guidelines: the current American Heart Association ratio of compressions to breaths for single-rescuer adult CPR is:

A. 15:2

B. 30:2 — 30 chest compressions (rate 100-120/min, depth 5-6 cm) followed by 2 rescue breaths (each 1 second, visible chest rise); perform 5 cycles (approximately 2 minutes) before reassessing or switching rescuers

C. 5:1

D. 15:1

✓ **Answer: B**

💡 **Rationale & Explanation:**

CPR rationale for 30:2 ratio: AHA 2020 guidelines: ADULT SINGLE-RESCUER CPR: 30 compressions: 2 breaths. RATE: 100-120 compressions/minute (to the beat of 'Stayin' Alive'). DEPTH: 5-6 cm (2-2.4 inches) for adults; allow full chest recoil. The 30:2 ratio was chosen because: interrupting compressions for breaths reduces coronary and cerebral perfusion pressure → the 30:2 ratio maximizes time spent on compressions; in the first minutes of cardiac arrest, oxygenation is less critical than circulation (blood is still relatively oxygenated); 30:2 is easier to remember and execute than 15:2. HANDS-ONLY CPR (no breaths): now acceptable for untrained bystanders and for adult witnessed cardiac arrest → call 911 and compress continuously at 100-120/min. PT RELEVANCE: all PTs should maintain current CPR certification; exercise-related cardiac events can occur during PT sessions (especially cardiac rehab, sports PT, elderly patients). Having a PAD (automated external defibrillator) accessible and knowing how to use it is essential.

├─ PHYSICAL AGENTS

97. The 'ice massage' technique delivers cryotherapy more intensely than ice packs because:

A. It is applied for a shorter time

B. DIRECT CONTACT with the ice and the MOVEMENT of the ice creates FRICTIONAL HEAT temporarily followed by RAPID HEAT EXTRACTION at the skin surface — achieving tissue cooling faster than a static ice pack; often applied to small areas like tendons, bursae, or trigger points

C. It is warmer than ice packs

D. It uses chemical cooling

✓ **Answer: B**

💡 **Rationale & Explanation:**

Ice massage technique: PROCEDURE: freeze water in a paper cup; peel back the paper to expose 2-3 cm of ice; apply the ice directly to the skin using CIRCULAR STROKES over the target area; apply for 5-10 minutes (until the area becomes numb). SENSORY PROGRESSION (CBAN sequence): Cold → Burning/aching sensation → Aching/deep ache → Numbness. Once NUMB: stretch or exercise (the 'cryo-stretch' or 'cryo-kinetics' technique). ADVANTAGES over ice packs: direct skin contact → faster temperature reduction; movement of the ice creates: temporary friction heating that slightly vasodilates the surface (appears redder) but net result is more rapid deep cooling; effective for small targets (lateral epicondyle, Achilles insertion, specific TrP). INDICATIONS: trigger point management, localized tendinopathy, bursitis. CONTRAINDICATIONS: open wounds, impaired sensation, vascular disease, Raynaud's. DURATION: strictly 5-10 minutes (direct contact more intense than a padded ice pack).

├─ EXERCISE SCIENCE

98. 'Functional Movement Training' in rehabilitation emphasizes:

A. Isolated single-joint exercises

B. EXERCISES THAT MIMIC REAL-WORLD MOVEMENT PATTERNS (multi-joint, multi-planar, often weight-bearing) — squats, lunges, reaching, pushing, pulling, carrying, rotating — to train movement quality and neuromuscular control for daily life and sport

C. Pure strength without functional context

D. Passive stretching only

✓ **Answer: B**

💡 **Rationale & Explanation:**

Functional movement training philosophy: traditional rehabilitation often over-emphasizes ISOLATED exercises (leg extensions, biceps curls) that strengthen individual muscles in controlled conditions.

FUNCTIONAL TRAINING bridges the gap between isolated strength and REAL-WORLD PERFORMANCE by training: MOVEMENT PATTERNS (not muscles): squat pattern (sit-to-stand, getting in/out of car), hip hinge (picking up objects), pushing (chest press → overhead press), pulling (rows → lat pull), carrying (farmer's carry, loaded walking), rotation (sport, reaching across body). MULTI-JOINT AND MULTI-PLANAR: real movements never occur in isolation — a tennis forehand involves hip rotation, trunk rotation, shoulder rotation, and wrist snap simultaneously. PROPRIOCEPTIVE CHALLENGE: functional exercises on single limb, unstable surfaces (when appropriate) train balance and neuromuscular control. PROGRESSION: isolated → combined joints → multi-planar → loaded → unstable → reactive → sport/work-specific. Both isolated (muscle-specific) AND functional exercises have a role — the ratio shifts from isolated (early rehabilitation) to functional (late rehabilitation/return to function) as recovery progresses.

⊢ PHYSICAL AGENTS

99. When using ultrasound over scar tissue, the DIRECTION of the transducer movement should be:

A. Random circular strokes only

B. A COMBINATION OF CIRCULAR and LONGITUDINAL strokes OVER and AROUND the scar — circular strokes over the scar tissue with the transducer moving slowly (2-3 cm/sec); longitudinal strokes to treat the length of the scar; this ensures even energy distribution over the restricted tissue

C. Stationary application for 30 seconds

D. Only perpendicular to the scar

✓ Answer: B

💡 **Rationale & Explanation:**

US application technique over scars: TECHNIQUE: 1) APPLY COUPLING GEL generously (scars often have irregular contours); 2) CIRCULAR STROKES: move transducer in small overlapping circles, covering 2-3×

the ERA per movement cycle, at ~2 cm/second; 3) LONGITUDINAL STROKES: along the length of the scar to treat the full extent of restricted tissue; 4) AREA: treat the scar tissue AND 2-3 cm beyond the edges (perilesional fibrosis extends beyond the visible scar margin); 5) DURATION: ~1-2 min per cm^2 of scar area; 6) PARAMETERS: 1 MHz (for scars >1-2 cm deep) or 3 MHz (superficial scars); 0.5-1.5 W/cm^2; continuous (for thermal effects that improve extensibility); 5-10 minutes total. IMMEDIATELY AFTER US: stretch the scar tissue within the 3-minute thermal window. PULSED US for recently healed wounds (avoid heating fragile new collagen). CONTINUOUS US for established scars (thermal extensibility effect needed).

├— CARDIOPULMONARY PT

100. The 'Borg CR10 scale' for dyspnea: a score of 5 ('heavy') during exercise should prompt the PT to:

A. Ignore it and continue

B. ASSESS the overall clinical picture: if the patient is stable (maintaining SpO2 ≥90%, no chest pain, no hemodynamic instability), score 5 may be acceptable for VIGOROUS exercise training — but if combined with SpO2 <90%, chest pain, or diaphoresis, reduce exercise intensity or stop

C. Immediately stop all PT services

D. Prescribe oxygen without physician consultation

✓ Answer: B

💡 **Rationale & Explanation:**

Borg CR10 = 5 interpretation: SCALE CONTEXT: 5 = 'Heavy/strong' dyspnea. In HEALTHY INDIVIDUALS during vigorous exercise: Borg CR10 of 5-7 is expected and acceptable. In CARDIAC OR PULMONARY PATIENTS: TARGET DYSPNEA during training: moderate (3-4 on CR10) is the usual target for initial training sessions. Score 5 ('heavy') may be acceptable for more conditioned patients in later rehabilitation phases. DECISION FACTORS: SpO2 ≥90% maintained? = can potentially

continue with close monitoring. SpO2 <88-90%? = REDUCE INTENSITY or STOP. Chest pain + dyspnea? = STOP, assess for cardiac ischemia, seek emergency assistance if needed. Diaphoresis + pale skin + altered consciousness? = STOP, emergency response. No accompanying warning signs? = reduce intensity slightly, reassess after 2-3 minutes at lower intensity. Documentation: record dyspnea level, SpO2, HR, and BP response to each exercise intensity — this data guides ongoing exercise prescription adjustments.

├─ PHYSICAL AGENTS

101. The 'LASER CLASSES' (1-4) are important for PT safety because:

A. Class designation is for marketing only

B. CLASS 1 = safe under normal use; CLASS 2 = visible light, safe for brief accidental exposure (blink reflex protects eyes); CLASS 3B = THERAPEUTIC LASERS — HAZARDOUS if directed at eyes, cannot look directly into the beam; CLASS 4 = surgical laser, always requires eye protection — NEVER look into or near the beam

C. All classes are equally safe

D. Only surgical lasers (Class 4) are used in PT

✓ Answer: B

💡 Rationale & Explanation:

Laser classification safety: CLASS 1: safe under all conditions, too low-powered to cause damage (e.g., CD player laser). CLASS 1M/2M: expanded beams, generally safe unless focused with optics. CLASS 2: visible light (400-700 nm), safe for brief exposure (<0.25s), blink reflex protects the eye (e.g., laser pointers). CLASS 3R: slightly hazardous, some risk from direct exposure. CLASS 3B: THERAPEUTIC LASER range — direct beam is hazardous to the eye; diffuse reflected beam is safe. PT must: WEAR APPROPRIATE LASER SAFETY GLASSES (wavelength-specific OD-rated protective eyewear); ensure the patient's eyes are covered; do not point at reflective surfaces; post laser hazard warning signs. CLASS 4: surgical lasers (cutting tissue) — extremely hazardous

to skin and eyes, always requires full protective measures. In PT: therapeutic cold lasers are typically Class 3B — always use appropriate eyewear protection for both therapist and patient. Do not look into the beam even while wearing standard sunglasses (which are NOT laser-safe).

├─ CARDIOPULMONARY PT

102. The 'COPD Assessment Test' (CAT) is a patient-reported outcome measure for COPD that:

A. Measures FEV1 directly

B. Uses 8 ITEMS scoring 0-5 each (total 0-40) covering: cough, phlegm, chest tightness, breathlessness on hills, activity limitation at home, confidence leaving home, sleep quality, and energy — CAT ≥10 = significant symptom burden; used in GOLD ABCD classification alongside mMRC

C. Tests exercise capacity

D. Measures arterial blood gases

✓ Answer: B

💡 Rationale & Explanation:

COPD Assessment Test (CAT, Jones et al. 2009): an 8-item patient-reported questionnaire that measures the IMPACT of COPD on the patient's life. 8 ITEMS scored 0-5 each: 1) Cough; 2) Phlegm; 3) Chest tightness; 4) Breathlessness going uphill/stairs; 5) Activity limitation at home; 6) Confidence leaving home; 7) Sleep quality; 8) Energy. Total 0-40. INTERPRETATION: 0-10 = low impact; 10-20 = medium; 20-30 = high; 30-40 = very high. The CAT is used in GOLD 2023 ABCD ASSESSMENT: combines spirometric severity (FEV1) WITH SYMPTOM BURDEN (CAT ≥10 OR mMRC ≥2) AND EXACERBATION HISTORY. Group A: fewer symptoms, less exacerbations; Group B: more symptoms; Group E: ≥2 exacerbations or ≥1 hospitalization. PR OUTCOMES: CAT improves after pulmonary rehabilitation (MCID = 2-3 points). PT should

administer CAT at baseline and after PR program to document treatment effectiveness for COPD patients.

├─ EXERCISE SCIENCE

103. 'Aerobic capacity' vs. 'anaerobic capacity': a patient who has excellent marathon running performance but poor 400-meter sprint performance demonstrates:

A. Equal capacity in both systems

B. HIGH AEROBIC CAPACITY (VO2max and lactate threshold optimized for sustained aerobic output) but RELATIVELY LOW ANAEROBIC CAPACITY (limited ability to sustain high-intensity anaerobic glycolysis); this is a normal adaptation — aerobic training somewhat reduces fast-twitch fiber proportion and short-duration power

C. Poor health overall

D. Normal athletic profile for all sports

✓ Answer: B

💡 **Rationale & Explanation:**

Aerobic vs. anaerobic training adaptation: ENDURANCE TRAINING ADAPTATIONS: VO2max increases; lactate threshold shifts right (can sustain higher intensity aerobically); mitochondrial density increases; Type IIx → IIa fiber type shift; SOME REDUCTION in peak anaerobic power (the body specializes). ANAEROBIC TRAINING ADAPTATIONS (sprinting, HIIT, plyometrics): improves ATP-PCr and glycolytic enzyme capacity; increases fast-twitch fiber activation; improves RFD (rate of force development); may slightly reduce aerobic endurance. This is why elite marathoners are NOT elite sprinters (and vice versa). REHABILITATION IMPLICATIONS: for a patient returning to mixed-sport (soccer, basketball): BOTH aerobic and anaerobic systems need rehabilitation; an athlete cannot return to soccer on aerobic fitness alone — anaerobic conditioning for sprinting, high-intensity bursts is equally important. Periodization of the rehabilitation program should include BOTH systems based on the demands of the target activity.

├— PHYSICAL AGENTS

104. The 'placebo effect' in physical modality treatment:

A. Does not exist for physical modalities

B. IS CLINICALLY SIGNIFICANT (up to 30-50% of pain reduction from modalities may be non-specific/placebo) — meaning the PATIENT-THERAPIST RELATIONSHIP, the ritual of treatment, and the patient's expectations contribute substantially to clinical outcomes alongside specific treatment effects

C. Only applies to medications

D. Is negligible in PT practice

✓ Answer: B

💡 **Rationale & Explanation:**

Placebo in physical modalities: STRONG EVIDENCE: sham ultrasound (machine turned on but not emitting waves) produces significant pain reduction in RCTs — often 30-50% of what is achieved with real US. This demonstrates the POWERFUL NON-SPECIFIC EFFECTS of: the therapeutic encounter (attentive care by a clinician); patient expectation (they believe they're receiving a beneficial treatment); the ritual of treatment (equipment set-up, gel application, therapist attention). IMPLICATIONS FOR PT PRACTICE: 1) The therapeutic relationship itself is THERAPEUTIC — invest in patient communication, education, and positive framing; 2) When studies show 'US = sham US' for pain, the whole-study outcome may still be positive — both groups improved, questioning the need for the expensive device; 3) Patient education can HARNESS the placebo effect ethically — explaining WHY a treatment should help (without deception) builds expectation and enhances response; 4) PTs who are warm, attentive, and confident likely achieve better outcomes than those who are detached, even using identical techniques.

CARDIOPULMONARY PT

105. The 'flow-volume loop' on spirometry in OBSTRUCTIVE lung disease (COPD, asthma) shows:

A. Normal curve

B. CONCAVE (scooped) EXPIRATORY LIMB — the flow rates decrease MORE RAPIDLY than normal as lung volume decreases during forced expiration, reflecting dynamic airway collapse (early airway closure) from loss of elastic recoil; the PEAK EXPIRATORY FLOW is reduced and reached later in the expiration

C. Elevated flow rates throughout

D. Only reduced peak flow

✓ Answer: B

💡 Rationale & Explanation:

Flow-volume loop interpretation: NORMAL: the expiratory limb has a triangular shape with a sharp peak (peak expiratory flow, PEF) near full lung volume, then a smooth linear decrease. OBSTRUCTIVE PATTERN (COPD, asthma): EXPIRATORY LIMB: concave (scooped inward) — flows drop precipitously after the initial peak, reflecting airway collapse during forced expiration; FEV1/FVC < 0.70 (diagnostic criterion); the PEF may be near normal but the mid- and late-expiratory flows are markedly reduced. RESTRICTIVE PATTERN (fibrosis, obesity): the loop is SMALLER and NARROWER (reduced TLC, FVC) but the SHAPE is relatively normal — no concavity in the expiratory limb; FEV1/FVC is normal or elevated (both FEV1 and FVC are reduced proportionally). VARIABLE OBSTRUCTION (asthma pre-bronchodilator → improved post-bronchodilator): loop improves with bronchodilator → reversible obstruction = asthma. COPD: less improvement with bronchodilator (irreversible component).

EXERCISE SCIENCE

106. The 'blood pressure response' to resistance exercise (isometric contraction) can reach dangerous levels. At what value should resistance exercise be stopped?

A. 200/110 mmHg

B. SYSTOLIC BP >250 mmHg OR DIASTOLIC BP >115 mmHg during exercise — these are ACSM guidelines for absolute termination of resistance exercise; systolic >180 mmHg and diastolic >100 mmHg at rest are contraindications to starting exercise

C. 300/200 mmHg

D. Any value above resting

✓ Answer: B

💡 **Rationale & Explanation:**

BP limits during resistance exercise: RESTING CONTRAINDICATIONS (do not start exercise): SBP >180 or DBP >110 at rest. DURING EXERCISE ABSOLUTE TERMINATION: SBP >250 mmHg or DBP >115 mmHg. WHY SO HIGH DURING EXERCISE? A normal BP response to maximal isometric exercise (Valsalva-heavy lifting) can reach 200-250 systolic transiently — this is tolerated by healthy vasculature. However, for CLINICAL PATIENTS (known CVD, hypertension, post-cardiac event): much more conservative limits are used — typically stop at SBP >200 mmHg during initial exercise sessions. ISOMETRIC vs. DYNAMIC: isometric exercise produces much greater BP spikes than dynamic exercise at equivalent intensities — the Valsalva maneuver further amplifies the spike. For HYPERTENSIVE patients: teach proper breathing (exhale during effort, no breath holding); monitor BP during exercise; start with lighter loads and high reps.

├— PHYSICAL AGENTS

107. The 'Russian current' stimulation is applied using parameters of:

A. 1 Hz, 1 mA

B. 2500 Hz medium-frequency AC delivered in 50 Hz BURST FREQUENCY — the 2500 Hz carrier frequency reduces skin impedance and allows more comfortable muscle activation; the 50 burst/second rate creates smooth tetanic contractions

C. 50 Hz continuous DC

D. 100 Hz low-voltage

✓ Answer: B

💡 **Rationale & Explanation:**

Russian current parameters: CARRIER FREQUENCY: 2500 Hz (medium frequency) — reduces skin impedance compared to low-frequency currents; allows current to penetrate more comfortably and deeply. BURST FREQUENCY: 50 bursts per second (50 Hz burst rate) — each burst lasting 10 ms with a 10 ms rest = 50% duty cycle within each burst. BURST DURATION: 10 ms on, 10 ms off. EFFECT: the 50 burst/second rate creates FUSED (smooth) TETANIC muscle contractions. USED FOR: muscle strengthening in rehabilitation (particularly quadriceps after knee surgery), preventing atrophy during immobilization, muscle re-education. ON:OFF RATIO for strengthening protocol: 10 seconds on : 50 seconds off (initially) to prevent fatigue; reduce rest ratio as patient tolerance improves. This is distinguished from standard NMES primarily by: its medium-frequency carrier, the burst pattern, and the specific claim (by Yakov Kots) of superior strength gains — though modern research shows comparable efficacy to other NMES waveforms.

├— CARDIOPULMONARY PT

108. In cardiac rehabilitation, the 'FITT principle' for patients with STABLE CORONARY ARTERY DISEASE recommends:

A. Maximum intensity always

B. F: 3-5 days/week; I: 40-80% HRR (or 40-60% VO2R initially, progressing to 60-80%); T: 20-60 min/session (start shorter, build to 30-60); T: large muscle group aerobic activities (walking, cycling,

swimming) — the ACSM/AHA guidelines for cardiac rehab exercise prescription

C. Daily maximum effort

D. Only walking at any pace

✓ Answer: B

💡 **Rationale & Explanation:**

Cardiac rehab FITT: FREQUENCY: 3-5 days/week (Phase II) — enough for training effect, recovery between sessions. INTENSITY: START at 40-60% HRR (or 40-60% VO2R); PROGRESS to 60-80% HRR for higher-functioning patients. Use RPE (Borg 11-14) when HR response is blunted by beta-blockers. STAY BELOW THE ISCHEMIC THRESHOLD (RPP or angina-free HR/BP limit). TIME: START with 15-30 min aerobic bouts (may need interval format: 5-10 min activity, 2 min rest initially); PROGRESS to 30-60 continuous minutes over 4-8 weeks. TYPE: AEROBIC large-muscle groups (walking, cycling, rowing, swimming); add RESISTANCE TRAINING 2-3 days/week after initial aerobic conditioning phase. FLEXIBILITY: daily stretching, especially calf/hamstring. Phase III (maintenance): patient self-manages exercise program with periodic PT monitoring; aims for ≥150 min/week moderate-intensity aerobic exercise as per secondary prevention guidelines.

├— EXERCISE SCIENCE

109. The 'neural adaptations' in the first 4-8 weeks of resistance training are clinically significant because:

A. They do not occur in rehabilitation patients

B. They explain why ELDERLY, DECONDITIONED, AND POST-SURGICAL PATIENTS can gain significant FUNCTIONAL STRENGTH RAPIDLY without major muscle hypertrophy — neural improvements include: increased motor unit recruitment, improved firing rate, reduced co-contraction, and better inter-muscular coordination

C. They always produce hypertrophy

D. They only occur in young athletes

✓ **Answer: B**

💡 **Rationale & Explanation:**

Neural adaptations to early resistance training: MECHANISMS: 1) MOTOR UNIT RECRUITMENT: initially, untrained individuals cannot voluntarily recruit all available motor units; training improves recruitment efficiency; 2) FIRING RATE: trained individuals can increase the firing frequency of motor units more rapidly; 3) SYNCHRONIZATION: motor units fire more synchronously during training; 4) REDUCED ANTAGONIST CO-CONTRACTION: trained individuals reduce opposing muscle activity during agonist contraction → more efficient force production; 5) BETTER INTER-MUSCULAR COORDINATION: synergist muscles work together more efficiently. CLINICAL IMPORTANCE: a post-TKA patient can increase their FUNCTIONAL STRENGTH (ability to rise from a chair, climb stairs) significantly within 2-4 weeks of PT even before substantial muscle hypertrophy occurs. This explains: why exercise is effective even in short rehabilitation programs; why starting exercise early (even with minimal loads) is beneficial; why the elderly (who hypertrophy less) still benefit greatly from resistance training — neural gains are preserved in aging.

├— PHYSICAL AGENTS

110. The 'Nociceptive Pain' vs. 'Neuropathic Pain' distinction affects TENS selection because:

A. Both respond identically to TENS

B. NOCICEPTIVE PAIN (from activated nociceptors — acute tissue injury) responds well to CONVENTIONAL TENS (gate control); NEUROPATHIC PAIN (from nerve damage — burning, shooting, allodynia) may respond better to ACUPUNCTURE-LIKE TENS (low frequency, high intensity opioid-mediated mechanisms) OR HIGH-

FREQUENCY TENS at lower intensity — the response is highly individual and requires clinical trialing

C. TENS is contraindicated for neuropathic pain

D. Only high frequency helps both

✓ Answer: B

💡 **Rationale & Explanation:**

TENS for nociceptive vs. neuropathic pain: NOCICEPTIVE PAIN: tissue damage → activated nociceptors (C-fibers, A-delta) → spinal dorsal horn → pain. CONVENTIONAL TENS (80-150 Hz) activates A-beta fibers → gate control → reduces nociceptive transmission. RESPONSE: good to excellent for acute musculoskeletal, post-operative, procedural pain. NEUROPATHIC PAIN: nerve damage (peripheral or central) → aberrant neural activity → spontaneous pain, allodynia, hyperalgesia. The damaged nerve may not respond normally to gate control. Evidence for TENS in neuropathic pain: moderate — some patients respond well; others do not. TRIAL APPROACH: test both conventional and acupuncture-like TENS in the individual patient. Modulation: some patients with neuropathic pain find that the TENS actually increases their allodynia (hypersensitive system reacts to any sensory stimulation) — in these patients, other modalities (LLLT, frequency-specific microcurrent, or pharmacotherapy) may be more appropriate.

├— EXERCISE SCIENCE

111. 'Task-specific training' applied to occupational rehabilitation (work hardening) means:

A. Generic gym exercises only

B. Progressively loading activities that SIMULATE THE SPECIFIC PHYSICAL DEMANDS OF THE PATIENT'S JOB — gradually increasing lifting capacity, duration, posture tolerance, and work pace to match occupational requirements before return to work

C. Cognitive training only

D. Any exercise program

✓ **Answer: B**

💡 **Rationale & Explanation:**

Work hardening / functional restoration: task-specific training for work rehabilitation: ASSESSMENT: Functional Capacity Evaluation (FCE) determines current physical capacity vs. job demands (Dictionary of Occupational Titles / O*NET for job physical requirements). PROGRAM: progressive loading of work-specific tasks: LIFTING (from floor, from shelves, overhead); CARRYING (different distances, loads, heights); POSTURE TOLERANCE (sustained sitting, standing, bending); HAND TASKS (fine motor, grip, pinch — if applicable); ENDURANCE (full workday tolerance); COGNITIVE (if returning to complex work). DURATION: 4-8 hours per day (to simulate a workday); 4-8 weeks typically. CRITERIA for return to work: patient can perform all essential job functions at job-equivalent intensity for 8 hours without excessive pain or fatigue. Work hardening is evidence-based for: reducing disability duration, improving return-to-work rates, and reducing re-injury rates compared to passive treatment and general conditioning.

├— PHYSICAL AGENTS

112. 'Ultrasound cavitation' types:

A. Only stable cavitation

B. STABLE CAVITATION (non-inertial): gas bubbles oscillate in the US field without collapsing — causes ACOUSTIC STREAMING (fluid movement around bubbles → enhanced cellular metabolism, membrane permeability, protein synthesis); INERTIAL (TRANSIENT) CAVITATION: bubbles grow and COLLAPSE violently — generates extreme local pressure and temperature — can damage tissue; avoided in therapeutic US by using PULSED mode and therapeutic (not excessive) intensities

C. Neither type occurs in clinical US

D. Cavitation only occurs with high-frequency US

✓ **Answer: B**

💡 **Rationale & Explanation:**

US cavitation and clinical safety: STABLE CAVITATION: therapeutic and beneficial — occurs at therapeutic intensities; stimulates cells, promotes healing (acoustic streaming enhances nutrient/waste transport across cell membranes). INERTIAL CAVITATION: potentially HARMFUL — violent bubble collapse; generates extreme local temperatures and pressures; can disrupt cell membranes; occurs at HIGH intensities and particularly at TISSUE INTERFACES (bone-soft tissue boundary). PREVENTION of inertial cavitation in clinical US: 1) Use PULSED MODE (limits energy buildup between pulses); 2) Keep INTENSITY within therapeutic range (0.5-2.0 W/cm²); 3) MOVE THE TRANSDUCER continuously (never stationary — especially over bony prominences); 4) Use adequate GEL (no air gaps → no intense reflection → no bubble nucleation at air-tissue interface). This explains why proper US technique (continuous transducer movement, no stationary application) is critical for safety.

├— CARDIOPULMONARY PT

113. The 'incentive spirometry' target volume for a post-operative patient should be:

A. Any volume the patient can achieve

B. THE PATIENT'S INDIVIDUAL PRE-OPERATIVE BASELINE (if measured) or at least 75-80% of age/height/sex-predicted INSPIRATORY CAPACITY — the goal is to MAXIMIZE tidal inspiration to prevent atelectasis; specific target gives the patient a quantifiable goal

C. 500 mL universally

D. Whatever the device maximum is

✓ **Answer: B**

💡 **Rationale & Explanation:**

Incentive spirometry goals: PRE-OPERATIVE BASELINE: ideally, the IS is measured PRE-OPERATIVELY to establish the patient's personal baseline. POST-OPERATIVELY: target achieving that same baseline volume or as close as possible. If no pre-operative measurement: use predicted inspiratory capacity (IC = IRV + TV) based on age, height, and sex. WHY SPECIFIC TARGETS? Visual biofeedback: the patient can see their current volume vs. the target marker → motivates deeper breaths → improves compliance. DOCUMENTATION: record the patient's maximum volume at each session → tracks improvement → indicates when ventilatory function is being restored. SESSION PROTOCOL: 10 slow maximal inspirations/hour while awake; maintain the peak inspiration for 2-3 seconds (to open collapsed alveoli); breathe normally between reps; encourage coughing after to clear secretions. RESEARCH NOTE: the evidence for IS preventing post-operative pulmonary complications is MIXED — recent meta-analyses show modest benefit; it is primarily effective when COMBINED with early ambulation, breathing exercises, and proper pain management.

├─ EXERCISE SCIENCE

114. The 'Borg RPE 20-point scale' was developed because:

A. 20 is an arbitrary number

B. THE SCALE RUNS FROM 6 TO 20 (not 0-10 or 1-10) — this range was specifically designed so that the RPE number APPROXIMATES HEART RATE/10 in a typical healthy adult: RPE 10 ≈ HR 100 bpm; RPE 15 ≈ HR 150 bpm; RPE 20 ≈ HR 200 bpm (HRmax); this makes it a quick proxy for HR in clinical settings

C. Borg preferred the number 20

D. Swedish tradition required a 20-point scale

✓ Answer: B

💡 **Rationale & Explanation:**

Borg's 6-20 RPE scale design rationale: Gunnar Borg designed the scale so that RPE × 10 ≈ HEART RATE in healthy individuals (resting HR ~60-

70 bpm ≈ RPE 6-7; HRmax ~200 bpm ≈ RPE 20). Scale anchor points: 6 = no exertion; 7 = extremely light; 9 = very light; 11 = light; 13 = somewhat hard; 15 = hard; 17 = very hard; 19 = extremely hard; 20 = maximal. CLINICAL UTILITY: Quick proxy for HR when HR monitoring is unavailable; when HR is altered by medication (beta-blockers blunt HR response — RPE is more reliable); when patients lose track of their HR during exercise. IMPORTANT CAVEAT: the HR-RPE relationship is only approximate and varies significantly between individuals, ages, fitness levels, and clinical conditions. Never REPLACE HR monitoring with RPE alone in cardiac patients — always use RPE as a SUPPLEMENTARY measure alongside HR, BP, and SpO2 in clinical settings.

⊢ PHYSICAL AGENTS

115. The 'thermal conductivity' of biological tissues affects heat modality application in that:

A. All tissues heat equally

B. FAT has LOW thermal conductivity (insulates, heats slowly); MUSCLE has HIGHER conductivity; BONE conducts heat differently — fat insulation between the skin surface and the deep target muscle means it takes longer to heat muscle through a fat layer; conversely, thin patients heat faster

C. Bone heats first

D. Fat heats more than muscle

✓ Answer: B

💡 Rationale & Explanation:

Thermal conductivity and clinical implication: FAT: low thermal conductivity → acts as an INSULATOR. CONSEQUENCE: in obese patients, the fat layer between the hot pack and the deep muscle acts as an insulator — less heat reaches the deep target tissue at the same treatment parameters. To achieve equivalent deep tissue heating in obese patients: either increase treatment duration OR use a modality that bypasses the fat layer (diathermy, ultrasound) rather than surface

heat. THIN PATIENTS: minimal fat insulation → heat reaches the skin from the hot pack more quickly → BURN RISK is higher. Use MORE LAYERS of toweling between the hot pack and the skin in thin patients. BONE: excellent conductor in some frequencies (US concentrates at bone-tissue interface — explains the periosteal burning sensation if US transducer is held stationary over bony prominences). Understanding tissue thermal properties guides safe and effective physical agent application in patients of varying body compositions.

├─ CARDIOPULMONARY PT

116. The 'Phase II' cardiac rehabilitation program is typically conducted in what setting and for how long?

A. Home only, 2 weeks

B. SUPERVISED OUTPATIENT CLINIC setting, typically for 36 sessions over 12 weeks (3×/week) — this is the standard covered by many insurance systems and supported by evidence as the optimal dose for cardiovascular benefits

C. Inpatient hospital, 6 months

D. Home without supervision

✓ Answer: B

💡 Rationale & Explanation:

Cardiac rehab Phase II structure: SETTING: outpatient hospital or clinic-based, with direct PT/ACSM-certified exercise physiologist supervision. DURATION: typically 36 SESSIONS over 12 WEEKS (3× per week) — this is the Medicare/PhilHealth standard for coverage in many systems. Why 36 sessions? Evidence shows continued cardiovascular benefit through this period; beyond 36 sessions, Phase III (community/maintenance) takes over. SESSION CONTENT: aerobic warm-up + steady-state cardio exercise + resistance training + cool-down; education sessions (nutrition, medications, smoking, stress management); risk factor monitoring. OUTCOMES of Phase II: VO2max increases ~15-25%; risk factor improvement; psychological benefit

(anxiety/depression reduction); reduced mortality and re-hospitalization rates by ~25%. MONITORING: continuous ECG (telemetry), BP before/during/after, RPE, SpO2 for pulmonary patients. Phase I = inpatient (2-4 days acute phase). Phase III = long-term maintenance community program. Phase IV = independent exercise program.

├─ EXERCISE SCIENCE

117. The 'hip circumference to waist circumference ratio' (waist-hip ratio, WHR) and 'waist circumference' (WC) are used in PT to assess:

A. Only aesthetics

B. CENTRAL ADIPOSITY and associated CARDIOVASCULAR RISK — abdominal (visceral) fat is more metabolically harmful than peripheral fat; WC >88 cm (women) or >102 cm (men) = significantly increased cardiovascular risk; exercise prescription should address both cardiovascular fitness AND weight management

C. Mobility only

D. Postural alignment only

✓ Answer: B

💡 **Rationale & Explanation:**

Waist circumference and cardiovascular risk: MEASUREMENT: waist circumference measured at the midpoint between the iliac crest and the lowest rib (or at the umbilicus — less reliable). RISK THRESHOLDS: MEN: WC ≥94 cm = increased risk; ≥102 cm = substantially increased risk. WOMEN: WC ≥80 cm = increased risk; ≥88 cm = substantially increased risk. WHR: waist/hip circumference ratio. Men >0.90, Women >0.85 = central obesity pattern = higher metabolic risk. CLINICAL SIGNIFICANCE: visceral (abdominal) fat produces pro-inflammatory cytokines (adipokines), free fatty acids, and increases insulin resistance → heightened risk of: diabetes, metabolic syndrome, hypertension, coronary artery disease. EXERCISE PRESCRIPTION for central obesity: both AEROBIC exercise (reduces visceral fat — even

without weight loss) and RESISTANCE TRAINING (increases metabolic rate) are effective. Aerobic exercise reduces visceral fat preferentially over subcutaneous fat. PT should incorporate WC measurement as a routine baseline and outcome measure for patients with metabolic conditions.

├─ PHYSICAL AGENTS

118. When treating a patient with IMPAIRED SENSATION using electrical stimulation or heat, the PT must:

A. Apply maximum intensity for better effect

B. PERFORM REGULAR SKIN CHECKS EVERY 5 MINUTES; START AT LOW INTENSITY; rely on OBJECTIVE SIGNS of overheating (skin color, mottling, burns) rather than the patient's report; obtain informed consent about the limited sensory feedback — as the patient cannot reliably report burning, the PT takes full responsibility for monitoring

C. Use higher intensity because sensation is impaired

D. Not modify the treatment protocol

✓ Answer: B

💡 **Rationale & Explanation:**

Impaired sensation safety protocol: the patient with impaired sensation (peripheral neuropathy, SCI below the level of injury, post-stroke sensory impairment, severe arthritis with reduced joint sensation) cannot reliably report THERMAL or ELECTRICAL overload through normal sensory feedback. PT RESPONSIBILITY: 1) INFORMED CONSENT: explain to the patient that you will be monitoring for them; 2) REDUCED INTENSITY: start at a LOWER intensity than for patients with normal sensation (heat: fewer towel layers → monitor more closely; TENS/NMES: start at minimum effective intensity); 3) FREQUENT SKIN CHECKS: visually inspect the treatment area every 5 minutes for: redness (erythema), mottling (irregular red patches = thermal injury developing), blistering (burn), skin blanching (electrical burn); 4) DURATION: reduce treatment time (10 min instead of 20 for

heat); 5) POSITIONING: ensure the insensate area is not in contact with heat inadvertently; 6) DOCUMENTATION: record all safety checks. This is one of the most important safety protocols in PT clinical practice.

├─ CARDIOPULMONARY PT

119. The 'dyspnea index' during exercise testing is measured as:

A. Only patient report

B. MVV (maximal voluntary ventilation) DIVIDED BY the PEAK MINUTE VENTILATION achieved during the test — if peak VE/MVV >85%, the patient is ventilatory limited (breathing is the limiting factor); if <85%, the limitation is cardiac or deconditioning

C. Respiratory rate alone

D. Blood oxygen only

✓ Answer: B

💡 **Rationale & Explanation:**

Ventilatory reserve and dyspnea index: during CARDIOPULMONARY EXERCISE TESTING (CPET): MAXIMAL VOLUNTARY VENTILATION (MVV): measured separately — patient breathes as fast and deeply as possible for 12 seconds; extrapolated to 1 minute (approximate maximum breathing capacity). PEAK MINUTE VENTILATION (peak VE): the highest VE achieved during the incremental exercise test. BREATHING RESERVE: MVV - Peak VE; or expressed as % (1 - Peak VE/MVV). INTERPRETATION: Normal at peak exercise: peak VE reaches approximately 70-80% of MVV (leaving some breathing reserve). VENTILATORY LIMITED exercise (dyspnea-predominant): peak VE/MVV ≥85% (>85% = using >85% of ventilatory capacity at peak exercise → lung/airway is the limiting factor); seen in SEVERE COPD, severe asthma, severe pulmonary fibrosis. CARDIOVASCULAR LIMITED: peak VE/MVV <70-75% (breathing capacity is not the limiting factor; heart rate reserve exhausted, or cardiac output is inadequate). This distinction guides the focus of treatment: ventilatory limited →

bronchodilation, respiratory muscle training, breathing technique; cardiovascular limited → cardiac rehab, exercise training.

├─ EXERCISE SCIENCE

120. 'Interval training' for cardiorespiratory rehabilitation involves:

A. Continuous exercise only

B. ALTERNATING PERIODS OF HIGHER INTENSITY (near or at target HR range) with LOWER INTENSITY RECOVERY PERIODS — allows cardiac patients to accumulate more HIGH-INTENSITY exercise minutes per session than they could achieve with continuous exercise; improves VO2max faster than moderate continuous exercise

C. Random speed changes

D. Only stretching intervals

✓ Answer: B

💡 **Rationale & Explanation:**

Interval training in cardiac rehab: STRUCTURE: work interval (e.g., 2-4 minutes at 70-80% HRmax) → recovery interval (e.g., 2-4 minutes at 40-50% HRmax) → repeat 4-6 times. TOTAL SESSION: 20-40 minutes of intervals + warm-up + cool-down. ADVANTAGES over continuous moderate exercise for cardiopulmonary patients: 1) Allows exposure to HIGHER INTENSITIES than continuous exercise (the recovery periods allow HR to drop before the next high-intensity interval); 2) GREATER VO2MAX IMPROVEMENT: systematic reviews confirm interval training produces ~2× greater VO2max improvements vs. moderate continuous exercise for cardiac patients; 3) PATIENT PREFERENCE: many patients prefer the varied intensity; 4) TIME-EFFICIENT: shorter total session for equivalent benefit. SAFETY: for Phase II cardiac rehab patients, interval training is demonstrated SAFE with appropriate monitoring (telemetry, RPE, symptomatic monitoring). Absolute contraindications to high-intensity intervals: unstable angina, recent acute event (<2 weeks), decompensated HF, severe valve disease, uncontrolled arrhythmias.

⊢ PHYSICAL AGENTS

143. The 'Beer-Lambert law' explains why light-based therapies lose intensity with tissue depth:

A. Intensity decreases linearly

B. INTENSITY DECREASES EXPONENTIALLY with depth — each unit depth absorbs a constant FRACTION of the remaining intensity; visible red (630-670nm) penetrates 0-5mm (superficial wounds); near-infrared (780-1100nm) penetrates 1-3+ cm (joints, tendons, deep muscles)

C. Intensity is constant

D. Distance has no effect

✓ Answer: B

💡 **Rationale & Explanation:**

Beer-Lambert in phototherapy: $I = I_o \times e^{(-\mu d)}$. CLINICAL IMPLICATIONS: deeper targets require longer wavelengths; no light-based therapy penetrates more than 3-5 cm in biological tissue. RED LIGHT (630-670nm): absorbed primarily by chromophores in superficial dermis → wound healing at 0-5mm. NEAR-INFRARED (780-1100nm): lower absorption by hemoglobin and water → DEEPER PENETRATION (1-3+ cm) → musculoskeletal structures. Selecting the wrong wavelength for the target depth wastes the therapy — always match wavelength to target tissue depth.

⊢ ELECTROTHERAPY

144. The 'accommodation' phenomenon means slowly rising electrical stimuli:

A. Produce stronger contractions

B. REQUIRE A HIGHER FINAL INTENSITY to trigger nerve firing because the nerve membrane adapts (accommodates) during the slow rise — explaining why RAMPED waveforms are more comfortable than abrupt square waves for muscle stimulation

C. Cause less pain

D. Have no effect on the nerve

✓ **Answer: B**

💡 **Rationale & Explanation:**

Accommodation: when an electrical stimulus rises SLOWLY to its peak (ramped waveform), the nerve membrane adjusts its sodium channel state → requiring a HIGHER FINAL INTENSITY to reach the action potential threshold. CLINICAL SIGNIFICANCE: slowly rising currents (ramp up 2-5ms) are MORE COMFORTABLE because accommodation partially raises the threshold before the peak is reached. Most NMES/TENS units have adjustable RAMP UP and RAMP DOWN times — exploiting accommodation to improve comfort. DENERVATED MUSCLE: lacks nerve accommodation → needs longer pulse widths (up to 300ms) and different waveforms for direct muscle fiber stimulation.

├— PHYSICAL AGENTS

145. UV-B phototherapy (280-315nm) is used therapeutically for psoriasis because it:

A. Tans the skin

B. Induces LOCAL IMMUNOSUPPRESSION and reduces keratinocyte proliferation — targeting the hyperproliferative epidermis of psoriatic plaques; also used for vitiligo (stimulates melanocyte migration); dosed by MINIMUM ERYTHEMA DOSE (MED)

C. Heats the skin deeply

D. Provides vitamin D directly

✓ **Answer: B**

💡 **Rationale & Explanation:**

UV-B for psoriasis: MECHANISM: UV-B penetrates epidermis and superficial dermis → REDUCES T-lymphocyte activity driving psoriatic inflammation; REDUCES KERATINOCYTE PROLIFERATION (slows abnormally fast cell turnover). DOSING: start at 70-80% MED, increase 10-15% per session. NARROW-BAND UV-B (NB-UVB, 311nm): preferred wavelength — more effective, fewer sessions needed, less erythema risk. MINIMUM ERYTHEMA DOSE (MED): the minimum UV-B dose producing mild redness without blistering — establishes a patient-specific dosing reference. PT role: in some settings PTs administer phototherapy; more commonly performed by dermatology.

├─ EXERCISE SCIENCE

146. RPE is ELEVATED (for the same absolute workload) by all of the following EXCEPT:

A. Heat and humidity

B. CAFFEINE INGESTION — caffeine acts as a central nervous system stimulant that actually LOWERS RPE at the same workload (central fatigue hypothesis); caffeine supplementation reduces perceived exertion and improves athletic performance

C. High altitude

D. Dehydration

✓ Answer: B

💡 **Rationale & Explanation:**

RPE modifiers — factors that INCREASE RPE: HEAT AND HUMIDITY (greater cardiovascular demand for thermoregulation); HIGH ALTITUDE (lower arterial PO2 → higher cardiovascular strain); DEHYDRATION (reduced plasma volume → cardiac drift); MUSCLE FATIGUE (accumulated metabolites amplify effort perception); ANXIETY/DEPRESSION. Factors that DECREASE RPE: CAFFEINE (central stimulant → reduces fatigue perception); MUSIC (distraction); POSITIVE MOOD; FAMILIAR ENVIRONMENT. CLINICAL APPLICATIONS: in heat/humidity and altitude, RPE is elevated → patients exert

themselves more for the same physiological strain → use RPE as the safety gauge, not just HR.

PHYSICAL AGENTS

147. The optimal 'LLLT dose' for nerve regeneration after peripheral nerve injury uses:

A. Same as wound healing (0.5-4 J/cm²)

B. 1-4 J/cm² at red or near-infrared wavelengths (660-830nm) — lower doses stimulate Schwann cells, promote neurotrophic factor production, reduce scar tissue around healing nerves, and accelerate axonal elongation; excessive dose inhibits nerve regeneration (Arndt-Schulz law)

C. 50 J/cm²

D. Continuous wave only at maximum power

✓ Answer: B

💡 **Rationale & Explanation:**

LLLT for peripheral nerve regeneration: RESEARCH: animal models and some human studies show LLLT accelerates peripheral nerve regeneration after crush injuries, post-surgical repair, CTS, Bell's palsy. OPTIMAL PARAMETERS: Wavelength: 660-830nm. Energy density: 1-4 J/cm² per point. Sessions: 5-10 sessions in first 2 weeks post-injury. DOSING CAUTION: Arndt-Schulz law — low dose = biostimulation; therapeutic range = optimal; HIGH DOSE = inhibition. For nerve regeneration: start at lower end (1-2 J/cm²) → progress to 3-4 J/cm²; excessive doses (>8-10 J/cm²) may inhibit regeneration. COMBINE WITH: progressive splinting, sensory re-education, progressive strengthening as reinnervation occurs.

CARDIOPULMONARY PT

148. **The 'GOLD ABCD Assessment' for COPD management uses:**

A. Spirometry alone

B. SPIROMETRY (FEV1% for GOLD 1-4) COMBINED WITH SYMPTOM BURDEN (CAT ≥10 or mMRC ≥2) and EXACERBATION HISTORY — Group A: low risk, low symptoms; Group B: low risk, high symptoms; Group E (formerly C/D): high exacerbation risk (≥2 moderate or ≥1 hospitalization)

C. Only symptom questionnaires

D. Only blood oxygen

✓ Answer: B

💡 **Rationale & Explanation:**

GOLD 2023 COPD Assessment: Step 1: SPIROMETRY for diagnosis and severity (FEV1/FVC <0.70 post-bronchodilator = COPD; FEV1% predicted: GOLD 1=mild ≥80%, GOLD 2=moderate 50-79%, GOLD 3=severe 30-49%, GOLD 4=very severe <30%). Step 2: ABCD for symptoms and exacerbation risk. Group A = ≤1 exacerbation/year AND CAT <10. Group B = ≤1 exacerbation AND CAT ≥10. Group E = ≥2 moderate exacerbations OR ≥1 hospitalization. ALL groups benefit from pulmonary rehabilitation — Groups B and E benefit most.

├─ EXERCISE SCIENCE

149. **'Blood flow restriction training' (BFR) allows strengthening at 20-30% 1RM because:**

A. It increases blood pressure dangerously

B. A pneumatic cuff creates PARTIAL VENOUS OCCLUSION — blood accumulates in the working muscle, creating local hypoxia and metabolic stress (lactate, H+) that stimulate IGF-1, mTOR, and satellite cell activation, producing hypertrophy and strength gains equivalent to high-load training

C. It uses 70% 1RM loads

D. It only increases HR

✓ **Answer: B**

💡 **Rationale & Explanation:**

BFR training: CUFF: 40-80% limb occlusion pressure (personalized). PROTOCOL: 20-30% 1RM, 4 sets (30+15+15+15 reps), 30-second rest. MECHANISM: partial venous occlusion → blood pools → rapid lactate accumulation → metabolic stress + cell swelling → anabolic hormones (GH, IGF-1) + mTOR activation → COMPARABLE HYPERTROPHY to 65-80% 1RM training. REHABILITATION: post-ACL reconstruction (low loads protect the graft while maintaining strength); post-TKA/THA; sarcopenia; any situation where high loads are not tolerable. SAFETY: monitor BP; contraindicated in uncontrolled hypertension, DVT risk, vascular disease.

⊢ PHYSICAL AGENTS

150. The 'thermal relaxation time' in laser therapy determines:

A. Nothing clinically relevant

B. Whether PULSED or CONTINUOUS WAVE laser produces more photobiomodulation vs. heat — pulse duration shorter than the thermal relaxation time allows the tissue to cool between pulses, promoting photobiological effects over thermal accumulation

C. Only relevant for surgical lasers

D. The same for all tissues

✓ **Answer: B**

💡 **Rationale & Explanation:**

Thermal relaxation time: time for target tissue to dissipate 63% of absorbed heat. For PHOTOBIOMODULATION (not tissue destruction): PULSED DELIVERY with short pulses (much shorter than TRT) → tissue cools between pulses → photochemical effects predominate → less thermal accumulation. CONTINUOUS WAVE: no cooling → thermal effects accumulate → higher tissue temperature. For wound healing and nerve regeneration: pulsed mode preferred. For musculoskeletal

heating: continuous or higher duty cycle. This concept explains why laser therapy parameters (pulsed vs. CW, frequency, duty cycle) are not interchangeable for different applications.

├— CARDIOPULMONARY PT

151. Aquatic cardiovascular response: CHEST-DEEP WATER IMMERSION produces:

A. No cardiovascular effects

B. INCREASED VENOUS RETURN (hydrostatic pressure compresses peripheral veins) → increased STROKE VOLUME → the SAME CARDIAC OUTPUT is achieved at a LOWER HEART RATE (immersion bradycardia of 10-17 BPM) — exercise prescriptions must REDUCE target HR by 10-17 BPM vs. land exercise

C. Reduced venous return

D. Identical response to land exercise

✓ Answer: B

💡 **Rationale & Explanation:**

Aquatic cardiovascular physiology: chest-deep immersion: HYDROSTATIC PRESSURE on chest wall + veins → increases VENOUS RETURN by up to 700 mL → increased PRELOAD → Starling mechanism → increased STROKE VOLUME → same CARDIAC OUTPUT at LOWER HR. BAINBRIDGE REFLEX: atrial stretch receptors respond to increased venous return → may also contribute to some HR adjustments. IMPLICATION: standard land-based HR targets for aquatic exercise are INVALID — reduce aquatic target HR by 10-17 BPM; or use RPE-based intensity. ADDITIONAL AQUATIC FACTORS: buoyancy reduces joint loading; evaporative cooling absent (patients may not realize they are sweating); lungs experience mild restriction from hydrostatic pressure.

├— EXERCISE SCIENCE

152. 'Concurrent training interference effect': the molecular mechanism involves:

A. Muscle protein synthesis stimulation

B. The AMPK pathway (activated by aerobic training) antagonizing the mTOR pathway (required for hypertrophy from resistance training) — aerobic exercise first activates AMPK → when resistance training follows, the mTOR anabolic response is blunted

C. Increased ATP synthesis

D. Hormonal depletion

✓ Answer: B

💡 **Rationale & Explanation:**

Concurrent training interference (molecular): AEROBIC EXERCISE activates AMPK (AMP-activated protein kinase) → energy conservation, catabolic signaling → INHIBITS mTOR. If aerobic done FIRST → mTOR response to subsequent resistance training is blunted → reduced hypertrophy and strength gains. MINIMIZING INTERFERENCE: 1) Separate sessions by ≥6-8 hours (AMPK returns to baseline); 2) Same session: RESISTANCE FIRST, then aerobic; 3) For most PT patients: the cardiovascular benefits outweigh the mild interference — combined training is still clearly beneficial; 4) For athletes maximizing strength: periodize (strength-focused blocks alternating with endurance blocks).

├— PHYSICAL AGENTS

153. The 'duty cycle of 50%' in pulsed ultrasound delivers approximately what thermal dose vs. continuous US?

A. 100% (same as continuous)

B. 50% of the continuous US thermal effects at the same SATP intensity — a useful setting for subacute conditions needing MODERATE heating combined with non-thermal effects

C. 25%

D. 75%

✓ **Answer: B**

💡 **Rationale & Explanation:**

Duty cycle 50% thermal effects: continuous US = 100% thermal dose. 50% duty cycle = US ON 50% of cycle, OFF 50% → 50% of thermal dose. CLINICAL APPLICATION: ACUTE (0-72 hours): 20-25% duty cycle → primarily non-thermal effects. SUBACUTE (72 hours to 3 weeks): 50% duty cycle → moderate thermal + non-thermal effects (transitional phase). CHRONIC (>3 weeks): continuous (100%) → maximum thermal for deep heating and collagen extensibility. INTENSITY ADJUSTMENT: to achieve same thermal effect with 50% pulsed as continuous at 1.0 W/cm²: increase SATP to 2.0 W/cm² (SATA = 50% × 2.0 = 1.0 W/cm² equivalent thermal dose).

├─ CARDIOPULMONARY PT

154. Bronchiectasis PT CORNERSTONE of treatment is:

A. Aerobic exercise only

B. AIRWAY CLEARANCE TECHNIQUES performed regularly (2-4 times daily) — ACBT, oscillating PEP devices (Aerobika, Flutter, Acapella), postural drainage, autogenic drainage — to mobilize and expectorate retained secretions, preventing infection and progressive lung damage

C. Passive stretching

D. Manual lymphatic drainage

✓ **Answer: B**

💡 **Rationale & Explanation:**

Bronchiectasis PT: PATHOLOGY: permanent bronchial dilatation → mucus trapping → bacterial colonization → repeated exacerbations → progressive lung damage. AIRWAY CLEARANCE GOAL: mobilize mucus DAILY from peripheral to central airways for expectoration. DEVICES: ACBT (no equipment, self-administered); OPEP — Flutter valve,

Acapella, Aerobika (oscillate airways during exhalation + provide back pressure → mobilize secretions); High-frequency chest wall oscillation vest (Afflovest). EVIDENCE: OPEP devices = ACBT; both better than no treatment. AEROBIC EXERCISE: valuable adjunct (improves mucociliary clearance) but airway clearance is the primary intervention.

├─ EXERCISE SCIENCE

155. 'EPOC' (Excess Post-exercise Oxygen Consumption) after high-intensity exercise:

A. Is a myth

B. Represents the elevated metabolic rate persisting after exercise ends (hours, sometimes >24 hours for HIIT) — contributing to total daily caloric expenditure; HIIT produces larger EPOC than moderate continuous exercise

C. Only occurs with weight training

D. Is identical for all exercise types

✓ Answer: B

💡 Rationale & Explanation:

EPOC (afterburn): FAST COMPONENT (minutes): replenishment of phosphocreatine stores; restoration of O2 in hemoglobin/myoglobin; re-establishing normal temperature and HR. SLOW COMPONENT (hours, sometimes >24 hours): circulating stress hormones (cortisol, catecholamines) maintaining elevated metabolic rate; muscle protein synthesis; glycogen resynthesis. MAGNITUDE: moderate continuous exercise: EPOC ≈ 5-10% of exercise energy expenditure. HIIT: EPOC ≈ 6-15%, lasting 12-24+ hours. CLINICAL SIGNIFICANCE: HIIT's larger EPOC contributes to comparable metabolic benefits at lower total exercise time; weight management programs can exploit EPOC. For cardiac/pulmonary patients: monitor elevated HR and RPE in the hour following HIIT.

PHYSICAL AGENTS

156. 'Moist vs. dry heat': clinically the MOST IMPORTANT distinction is:

A. One is always safer

B. Both require ADEQUATE INSULATION (towel layers) to prevent burns — moist hot packs (68-80°C) MUST be wrapped in 6-8 towel layers; electric heating pads can create localized hotspots at coil locations; wet electric pads add electrical hazard concerns

C. Moist heat needs no towel

D. Dry heat is always preferred

✓ Answer: B

💡 Rationale & Explanation:

Moist vs. dry heat safety: HOT PACKS (hydrocollator) at 65-80°C: MUST ALWAYS be wrapped in 6-8 towel layers — the pack itself is a burn hazard at 65-80°C; the insulation reduces surface temperature to therapeutic range (~38-42°C at skin). ELECTRIC HEATING PADS: lower temperatures (40-60°C) but can create UNEVEN HEATING (hotspots at coil locations); patients can fall asleep → prolonged localized overheating → burns. SAFE PRACTICE for both: regularly check the patient's skin during treatment; never apply any heat source directly to bare skin without adequate insulation; educate patients not to lie on heating devices.

CARDIOPULMONARY PT

157. Pulmonary rehabilitation for ILD (interstitial lung disease) provides benefit by:

A. Reversing fibrosis

B. Improving EXERCISE TOLERANCE and DYSPNEA by addressing peripheral muscle deconditioning and psychological factors — even

though the structural lung changes are irreversible, the peripheral factors CAN be improved

C. Increasing FVC

D. Normalizing SpO2

✓ **Answer: B**

💡 **Rationale & Explanation:**

PR in ILD: IPF and other ILDs → fibrosis → reduced lung volumes → impaired gas exchange → exertional hypoxemia → progressive dyspnea → deconditioning → further limitation. THE FIBROSIS CANNOT BE REVERSED by PR. BUT: PERIPHERAL MUSCLE DECONDITIONING can be improved; CARDIOVASCULAR FITNESS can improve; BREATHING EFFICIENCY and dyspnea management improve; PSYCHOLOGICAL IMPACT (anxiety, depression) responds to PR. EVIDENCE: RCTs show PR in IPF significantly improves 6MWT (+27-55m), dyspnea, and QoL. CONSIDERATIONS: many ILD patients DESATURATE during exercise → supplemental O2, close SpO2 monitoring, lower training intensities. Benefits maintained for ~6 months before additional PR or maintenance programs are needed.

├— EXERCISE SCIENCE

158. The 'SAID principle' applied to stretching means:

A. Stretch as hard as possible

B. Stretch the SPECIFIC muscles that are TIGHT for a given dysfunction — general stretching does not specifically address postural imbalances; each tight structure requires its own targeted stretch

C. Always stretch bilaterally

D. Stretch before every exercise

✓ **Answer: B**

💡 **Rationale & Explanation:**

SAID in flexibility: SPECIFIC ADAPTATION TO IMPOSED DEMAND applies to stretching: stretching only produces lasting flexibility improvements

in the SPECIFICALLY STRETCHED tissues. EXAMPLE: a patient with iliopsoas and rectus femoris tightness + hamstring tightness: prescribe SPECIFIC stretches for each tight muscle. AVOID: general 'stretch everything' programs that may stretch already elongated structures (e.g., stretching the overstretched posterior neck extensors in forward head posture). Clinical stretching programs should be TARGETED to the specific tight tissues identified in assessment — not generic.

├— PHYSICAL AGENTS

159. 'Ultrasound transducer' must be kept moving during treatment because:

A. It improves coverage

B. A STATIONARY TRANSDUCER over tissue produces a STANDING WAVE PATTERN and localized PERIOSTEAL HEATING (bone-tissue interface) that can cause pain and tissue damage — continuous movement distributes energy evenly and prevents hot spots

C. It improves the display

D. The gel dries faster

✓ Answer: B

💡 **Rationale & Explanation:**

US transducer movement rationale: STATIONARY APPLICATION: the ultrasound beam creates a STANDING WAVE (interference between the incident and reflected waves at bony surfaces) → INTENSE FOCAL HEATING at the periosteum → sharp burning pain → possible tissue damage. MOVING TRANSDUCER (2-3 cm/second, overlapping circles): distributes energy over a larger area → no standing wave formation → no periosteal hot spots → safe and effective. CLINICAL RULES: NEVER hold the transducer stationary over tissue (especially over bony prominences); move continuously at 2-3 cm/sec in overlapping circles covering 2× the ERA; cover the entire treatment area systematically.

├— CARDIOPULMONARY PT

160. The 'CPR ratio of 30:2' was selected because:

A. It is easier to remember than 15:2

B. Interrupting compressions for breaths reduces coronary and cerebral perfusion pressure; the 30:2 ratio MAXIMIZES TIME ON COMPRESSIONS — the most critical component of CPR; the blood remains relatively oxygenated in the first minutes so brief interruptions for breaths are less harmful than interrupting the compression rhythm

C. 30 is a lucky number

D. Most people prefer 30:2

✓ Answer: B

💡 **Rationale & Explanation:**

CPR 30:2 rationale (AHA 2020): RATE: 100-120 compressions/minute. DEPTH: 5-6 cm (adults). RATIONALE FOR 30:2: interrupting compressions for breaths drops coronary and cerebral perfusion pressure (which builds up gradually with each compression) → 30 compressions before interruption is the optimal balance; in the first 5-10 minutes of cardiac arrest, blood is still relatively oxygenated → compressions are more important than ventilation; HANDS-ONLY CPR: now acceptable for untrained bystanders and adult witnessed cardiac arrest. PT RELEVANCE: all PTs should maintain current CPR certification and know how to use an AED.

├— PHYSICAL AGENTS

161. 'Iontophoresis maximum current density' safety limit is:

A. 5 mA/cm²

B. 0.5 mA/cm² — exceeding this causes electrochemical burns (pH-induced burns from acid/base accumulation under the electrodes)

that are often painless during the session and develop over 24-48 hours post-treatment

C. 10 mA/cm²

D. 0.01 mA/cm²

✓ Answer: B

💡 **Rationale & Explanation:**

Iontophoresis safety: maximum current density = 0.5 mA/cm². Formula: Maximum Current (mA) = Electrode Area (cm²) × 0.5. Example: 4 cm² electrode × 0.5 = maximum 2 mA safe current. EXCEEDING: electrochemical reactions at the electrode-skin interface → acids (anode) and bases (cathode) accumulate → ELECTROCHEMICAL BURNS (deep, slow-healing). These burns are particularly dangerous because: may not be painful during the session (analgesia from current); develop over 24-48 hours post-treatment. SAFE PRACTICE: calculate maximum current before every treatment; use appropriate electrode size; start at low current and gradually increase; check skin before, during, and after treatment.

├─ EXERCISE SCIENCE

162. 'Isometric training' — the PRIMARY limitation of single-angle isometric training is:

A. It is too easy

B. ANGLE-SPECIFICITY — strength gains are greatest at the trained angle and taper off within ±15-20° of that angle; multiple angles or full-range dynamic training is more effective for generalizing strength gains across the functional range

C. It always causes injury

D. It has no applications in rehabilitation

✓ Answer: B

💡 **Rationale & Explanation:**

Isometric angle-specificity: isometric training at one angle produces strength gains PRIMARILY at that angle (±15-20°). IMPLICATIONS: for PATELLAR TENDINOPATHY: isometric holds at 60° knee flexion provide analgesia and initial loading — but must progress to full-range dynamic exercise; for post-surgical immobilized joints: isometrics at the available angle are starting point — progress to full range as mobility allows; for PAIN INHIBITION: isometrics at pain-free angles begin when through-range exercise is too painful. Strategically selecting training angles to match functional demands is part of evidence-based exercise prescription.

├— PHYSICAL AGENTS

163. 'Ultrasound cavitation' types: the clinically RELEVANT type for therapeutic US is:

A. Inertial (transient) cavitation only

B. STABLE CAVITATION (non-inertial) — gas bubbles oscillate without collapsing, causing ACOUSTIC STREAMING that enhances cellular metabolism, membrane permeability, and protein synthesis; this is the beneficial non-thermal mechanism of pulsed US

C. Neither type occurs in clinical US

D. Cavitation only occurs at high frequencies

✓ Answer: B

💡 **Rationale & Explanation:**

US cavitation types: STABLE CAVITATION: therapeutic; bubbles oscillate in the US field without collapsing → ACOUSTIC STREAMING (fluid movement around bubbles) → enhanced cellular metabolism, membrane permeability, protein synthesis; stimulates healing. INERTIAL (TRANSIENT) CAVITATION: potentially HARMFUL — violent bubble collapse, extreme local pressure and temperature → can disrupt cell membranes; avoided in therapeutic US by: PULSED mode (limits energy buildup), therapeutic intensity ranges (0.5-2.0 W/cm²), CONTINUOUS TRANSDUCER MOVEMENT (prevents standing waves).

Understanding cavitation explains why proper US technique (moving transducer, appropriate intensity) is essential for safety.

CARDIOPULMONARY PT

164. The '6-Minute Walk Test' MCID for COPD is approximately:

A. 5 meters

B. 25-35 meters — changes smaller than this are likely within measurement error and not clinically meaningful to the patient; changes of 54+ meters represent a large clinically important improvement

C. 100 meters

D. 200 meters

✓ Answer: B

💡 **Rationale & Explanation:**

6MWT MCID for COPD: the MCID (Minimal Clinically Important Difference) for the 6MWT in COPD = approximately 25-35 meters (some sources suggest 54+ meters for 'large' meaningful improvement). If a patient improves 6MWT by only 10 meters after 12 weeks of pulmonary rehabilitation: this is BELOW the MCID → the improvement may not be clinically meaningful despite being statistically significant. If the patient improves by 40 meters: above MCID → clinically meaningful improvement in functional exercise capacity. Using the MCID prevents overinterpreting small improvements and helps counsel patients on whether their rehabilitation is producing clinically relevant gains.

EXERCISE SCIENCE

165. 'Power training' (for rate of force development) uses loads of:

A. 90-100% 1RM

B. 30-70% of 1RM lifted as EXPLOSIVELY AS POSSIBLE — at these loads, the POWER OUTPUT (force × velocity) is maximized; training at maximal loads emphasizes force but at low velocity; training at very light loads emphasizes velocity but with low force; 30-70% produces the optimal force-velocity balance

C. 10-20% 1RM

D. Fixed load always

✓ Answer: B

💡 **Rationale & Explanation:**

Power training optimal load: POWER = Force × Velocity. The force-velocity curve peaks at approximately 30-50% of maximum isometric force (roughly 30-70% 1RM depending on the exercise). PROTOCOL: 3-5 sets × 3-6 reps; FULL RECOVERY between sets (3-5 min); MAXIMAL INTENT and SPEED of movement is the critical coaching cue; exercises: jump squats, medicine ball throws, kettlebell swings, Olympic lifts. FALL PREVENTION: power training important for elderly (reactive stepping requires explosive muscle power); ACL rehabilitation (landing biomechanics require rapid eccentric power control); return to sport (explosive movement demands).

├— PHYSICAL AGENTS

166. 'Photobiomodulation dosing': energy density should NOT be:

A. 1-4 J/cm² for wound healing

B. ABOVE 8-10 J/cm² for most soft tissue conditions because EXCESSIVE DOSE CAUSES INHIBITION rather than biostimulation (Arndt-Schulz law) — the dose-response for LLLT is an inverted U-shape: too low = no effect, therapeutic range = biostimulation, too high = inhibition

C. 3-6 J/cm² for tendinopathy

D. 1-8 J/cm² for pain relief

✓ Answer: B

💡 **Rationale & Explanation:**

LLLT Arndt-Schulz dose-response: <0.5 J/cm² = BELOW biostimulation threshold (no effect). THERAPEUTIC WINDOW (tissue-specific): 1-8 J/cm² for most conditions. ABOVE 10 J/cm² = INHIBITORY for most tissues (too much energy disrupts cellular homeostasis). CLINICAL MONITORING: track patient response — if symptoms WORSEN after treatment → dose may be too high; if no response after 3-4 sessions → dose may be too low; adjust accordingly. WAVELENGTH INTERACTION: the same energy density from different wavelengths has different effects — deeper-penetrating NIR at the same J/cm² on the surface may deliver less effective energy density at depth than a shallower target would receive.

├— CARDIOPULMONARY PT

167. 'Inspiratory muscle training' (IMT) for COPD: recommended starting intensity is:

A. 10% MIP

B. 30% of MAXIMAL INSPIRATORY PRESSURE (MIP) — evidence-based starting intensity; progress by 5-10% every 2 weeks; target range 30-60% MIP for significant training effect; frequency: 30 repetitions, 2×/day, 5-7 days/week, 8-12 weeks

C. 80% MIP from the start

D. Any breathing intensity

✓ Answer: B

💡 **Rationale & Explanation:**

IMT dosage: THRESHOLD LOAD DEVICE: spring-loaded valve requiring minimum inspiratory pressure to open. Starting intensity: 30% MIP. PROGRESSION: increase load by 5-10% every 2 weeks or when patient can complete 30 reps without dyspnea at current load. Target: 50-60% MIP for significant training effect. FREQUENCY: 30 reps, 2×/day, 5-7 days/week, 8-12 weeks. EVIDENCE: reduces dyspnea, improves 6MWT,

improves inspiratory muscle strength in COPD with inspiratory muscle weakness (MIP <60% predicted). IDENTIFY CANDIDATES: measure MIP — patients with MIP <60% predicted benefit most from IMT as a targeted intervention.

EXERCISE SCIENCE

168. Muscle mass per kilogram at rest burns approximately:

A. 0.5 kcal/day

B. 13-15 kcal/kg/day — much more than fat tissue (~4.5 kcal/kg/day); this explains why resistance training increases RMR and why sarcopenia (age-related muscle loss) progressively lowers RMR, contributing to age-related weight gain

C. 100 kcal/day

D. 50 kcal/day

✓ Answer: B

💡 Rationale & Explanation:

Muscle metabolic activity: skeletal muscle RMR = approximately 13-15 kcal/kg/day. Fat tissue RMR = approximately 4.5 kcal/kg/day. IMPLICATION: each kg of muscle mass gained from resistance training → RMR increases by ~13-15 kcal/day. After 12 weeks of progressive resistance training (typical 1-3 kg lean mass increase): RMR increases by ~15-45 kcal/day. SARCOPENIA: ~1% muscle mass loss per year after age 30 → progressive RMR decrease → metabolic rate decline. REHABILITATION: resistance training in ICU/post-surgical patients restores muscle mass → restores RMR → contributes to recovery and weight management. This evidence supports including resistance training as a routine component of most rehabilitation programs.

PHYSICAL AGENTS

169. 'US periosteal heating' pain during treatment occurs because:

A. Gel becomes too hot

B. The US STANDING WAVE at the bone-soft tissue interface creates intense focal PERIOSTEAL HEATING — the periosteum is richly innervated and extremely sensitive to heat; this is the signal that the transducer must be moved immediately

C. The frequency is too low

D. The patient has thin skin

✓ Answer: B

💡 **Rationale & Explanation:**

Periosteal heating and pain: at the BONE-SOFT TISSUE INTERFACE: the reflected US wave from bone and the incident wave create a STANDING WAVE PATTERN → intense focal energy concentration at the periosteum → periosteal heating → SHARP, BURNING PAIN (the periosteum is one of the most pain-sensitive tissues in the body). This is a SAFETY SIGNAL: when the patient reports sharp, deep, burning pain during US → MOVE THE TRANSDUCER IMMEDIATELY. Prevention: continuous transducer movement; never treat bony prominences with a stationary transducer; caution in areas with thin overlying tissue (e.g., medial malleolus, tibial crest, dorsal foot).

├— CARDIOPULMONARY PT

170. The 'VE/VCO2 slope' in CPET: a value above 34-35 in heart failure suggests:

A. Normal ventilatory efficiency

B. POOR PROGNOSIS — excessive ventilation relative to CO2 output, indicating ventilatory inefficiency from V/Q mismatch and heightened chemoreceptor sensitivity; VE/VCO2 >45 = severely abnormal; used for heart transplant candidacy assessment (with VO2max <10-12 mL/kg/min)

C. High cardiovascular fitness

D. Excellent prognosis

✓ **Answer: B**

💡 **Rationale & Explanation:**

VE/VCO2 slope in HF: NORMAL: ~24-30. HF elevated due to: ventilation-perfusion mismatch, increased physiological dead space, heightened chemoreceptor sensitivity. PROGNOSTIC THRESHOLDS: >34 = moderately abnormal; >45 = severely abnormal (poor prognosis, increased mortality). COMBINED WITH VO2max: VO2max <10-12 mL/kg/min AND high VE/VCO2 slope = strongest indicators for heart transplant candidacy. PT: patients with high VE/VCO2 slopes need lower exercise intensities, close monitoring, may benefit from specific ventilatory training; used to guide cardiac rehab intensity programming.

├─ EXERCISE SCIENCE

171. 'Neural adaptations' in the first 4-8 weeks of resistance training explain why:

A. No strength gains occur early

B. Elderly, deconditioned, and post-surgical patients can gain significant FUNCTIONAL STRENGTH RAPIDLY without major muscle hypertrophy — improved motor unit recruitment, firing rate, reduced co-contraction, and better inter-muscular coordination produce rapid strength gains before hypertrophy develops

C. Hypertrophy occurs first

D. Athletes can skip early phases

✓ **Answer: B**

💡 **Rationale & Explanation:**

Neural adaptations to early resistance training: MECHANISMS: 1) MOTOR UNIT RECRUITMENT: initially, untrained individuals cannot voluntarily recruit all available motor units; training improves recruitment efficiency; 2) FIRING RATE: trained individuals increase

motor unit firing frequency more rapidly; 3) REDUCED ANTAGONIST CO-CONTRACTION: trained individuals reduce opposing muscle activity → more efficient force production; 4) INTER-MUSCULAR COORDINATION: synergist muscles work together more efficiently. CLINICAL: post-TKA patient can increase FUNCTIONAL STRENGTH in 2-4 weeks even without hypertrophy; elderly patients (who hypertrophy less) still benefit greatly from resistance training; neural gains are preserved in aging.

⊢ PHYSICAL AGENTS

172. 'tDCS' (transcranial direct current stimulation) is an emerging PT adjunct that:

A. Delivers current to muscles

B. Applies weak DC current (1-2 mA) through scalp electrodes to MODULATE CORTICAL EXCITABILITY — anodal tDCS increases excitability; cathodal decreases it; used in stroke, depression, chronic pain, and cognitive rehabilitation research

C. Replaces TENS

D. Only treats vestibular disorders

✓ Answer: B

💡 **Rationale & Explanation:**

tDCS in rehabilitation research: non-invasive brain stimulation. ANODAL tDCS over motor cortex: increases neuronal excitability → may improve motor function when combined with physical practice in stroke. CATHODAL tDCS: decreases excitability — used to suppress the unaffected hemisphere in stroke (reduce interhemispheric inhibition). PARAMETERS: 1-2 mA; 20-30 minutes; multiple sessions (10-15) for cumulative effect. EVIDENCE: moderate — some RCTs show improved UE function post-stroke when tDCS combined with PT; mixed results for other conditions. SAFETY: well tolerated; mild scalp tingling. Still primarily research setting — not standard clinical practice. PT should be aware of emerging adjunct technologies.

├— CARDIOPULMONARY PT

173. The 'Harvard Step Test' estimates cardiovascular fitness by:

A. Directly measuring VO2max

B. Measuring HEART RATE RECOVERY after a standardized stepping protocol — faster HR recovery = higher cardiovascular fitness; HR at 1-1.5-2 minutes post-exercise used to calculate the Physical Fitness Index

C. Testing lung function

D. Measuring balance during stepping

✓ Answer: B

💡 Rationale & Explanation:

Harvard Step Test: 50 cm bench, step up and down 30 steps/minute for 5 minutes; measure HR at 1-1.5-2 minutes post-exercise; calculate Physical Fitness Index from HR recovery rate. RATIONALE: lower HR for the same exercise intensity = better cardiovascular fitness (higher stroke volume per beat = less HR needed). ADVANTAGES: no equipment beyond a step and HR monitor; safe for clinical populations; widely used in occupational health, cardiac screening. LIMITATIONS: step height and body weight affect metabolic demand; anxiety and motivation affect HR. Chester Step Test: 15 cm step, 5 stages at progressively faster rates; HR at each stage extrapolated to estimated VO2max.

├— EXERCISE SCIENCE

174. The 'VO2max' value of <18 mL/kg/min is clinically significant because:

A. It is normal for elderly

B. It indicates HIGH SURGICAL RISK and poor prognosis in heart failure — patients with VO2max <18 mL/kg/min have significantly elevated

perioperative mortality risk and poor long-term prognosis if they have heart failure; cardiac rehabilitation aims to increase this value

C. It is a sports performance benchmark

D. It indicates need for surgery

✓ Answer: B

💡 **Rationale & Explanation:**

VO2max clinical thresholds: <18 mL/kg/min = HIGH SURGICAL RISK (perioperative complication and mortality risk significantly elevated); HEART FAILURE PROGNOSIS: VO2max <10-12 mL/kg/min = very poor prognosis, heart transplant candidacy consideration; 12-18 mL/kg/min = moderate-severe HF, intensive cardiac rehabilitation indicated; >18 mL/kg/min = better prognosis. CARDIAC REHABILITATION GOAL: increase VO2max through aerobic training (typically 15-25% improvement over 12 weeks of Phase II rehab) → shifts patients to a safer prognostic category. In the Philippines: VO2max testing is becoming more available through CPET (cardiopulmonary exercise testing) in tertiary hospitals.

├─ PHYSICAL AGENTS

175. The 'RATER model' for physical agent clinical decision-making: 'E' stands for:

A. Equipment type

B. EVIDENCE — what does the research say about this agent for this condition? (level of evidence, type of studies, clinical practice guidelines, effect sizes, comparison to other interventions) — this step ensures physical agent selection is guided by the best available evidence, not just habit or availability

C. Electrode placement

D. Environment

✓ Answer: B

💡 **Rationale & Explanation:**

RATER framework: R = RATIONALE (why this agent for this patient/condition — physiological mechanism); A = APPLICATION (how to apply — parameters, technique, duration); T = TOXICOLOGY/SAFETY (contraindications, precautions); E = EVIDENCE (what does the research say — level of evidence, effect sizes, comparison to other interventions); R = REASSESSMENT (how to evaluate treatment effect and when to modify). The EVIDENCE step prevents 'habit prescribing' (always using the same modality for the same diagnosis regardless of evidence). Evidence for US in tendinopathy: moderate Level 2 evidence when combined with eccentric exercise; evidence for US alone is weaker.

├— CARDIOPULMONARY PT

176. The 'absolute contraindications to exercise testing' include:

A. Mild asthma

B. MYOCARDIAL INFARCTION within past 2-6 days, DECOMPENSATED HEART FAILURE (active pulmonary edema), DANGEROUS ARRHYTHMIAS (sustained VT, complete heart block), SEVERE AORTIC STENOSIS (valve area <1 cm²) — these represent conditions where exercise testing carries unacceptably high risk of serious adverse events

C. Mild hypertension

D. Minor exercise intolerance

✓ Answer: B

💡 Rationale & Explanation:

ACSM absolute contraindications to exercise testing: RECENT MI (2-6 days — ischemic myocardium vulnerable); DECOMPENSATED HF (cardiovascular system cannot maintain stable output); UNCONTROLLED LIFE-THREATENING ARRHYTHMIAS (may deteriorate to cardiac arrest); SEVERE AORTIC STENOSIS (fixed outflow obstruction → CO cannot increase → syncopal risk). ADDITIONAL: active myocarditis, suspected dissecting aortic aneurysm, acute PE,

uncontrolled hypertension (SBP >200, DBP >110). Compare with RELATIVE CONTRAINDICATIONS (exercise testing can proceed with careful monitoring and risk-benefit analysis).

├─ EXERCISE SCIENCE

177. 'Balance training for fall prevention' in older adults: the component with HIGHEST level evidence is:

A. Flexibility training

B. PROGRESSIVE BALANCE CHALLENGE — exercises reducing base of support, eliminating upper extremity support, adding dual-tasks, using unstable surfaces, and including reactive balance challenges; static balance exercises alone have WEAK evidence; OTAGO Exercise Programme (progressive strength + balance) has Level 1a evidence for reducing falls

C. Cardiovascular endurance only

D. Passive stretching

✓ Answer: B

💡 Rationale & Explanation:

Fall prevention balance training — highest evidence: OTAGO EXERCISE PROGRAMME (Robertson, 2002): progressive lower limb strengthening + balance exercises + walking plan; 17-30% fall reduction in community-dwelling elderly; Level 1a (multiple meta-analyses). KEY FEATURES: PROGRESSIVE (starts easy, increases difficulty over weeks); MULTI-COMPONENT (strength + balance + functional training); FREQUENCY: ≥2-3 sessions/week × ≥12 weeks; HOME-BASED or GROUP: both effective. KEY EVIDENCE: DYNAMIC BALANCE CHALLENGES (reactive stepping, obstacle courses) have strongest evidence; STATIC EXERCISES alone (standing on foam, eyes closed) have WEAK evidence; WALKING programs alone do NOT significantly reduce falls.

├— PHYSICAL AGENTS

178. 'Fluidotherapy' (fluidized bed therapy) differs from whirlpool in that:

A. It is the same as whirlpool

B. It uses HEATED FINE CELLULOSE PARTICLES suspended by warm air — providing dry heat, sensory desensitization, and SIMULTANEOUS ACTIVE EXERCISE within the unit; no infection control concerns; excellent for CRPS (desensitization) and hand rehabilitation

C. It provides cold therapy

D. It is used for full body immersion

✓ Answer: B

💡 **Rationale & Explanation:**

Fluidotherapy vs. whirlpool: FLUIDOTHERAPY: heated air + cellulose particles; semi-liquid consistency; 38-46°C; allows ACTIVE EXERCISE during treatment (patient can squeeze, flex, extend the hand/foot within the unit); DRY — no infection concerns; SENSORY DESENSITIZATION (moving particles provide continuous tactile input — excellent for CRPS hypersensitivity). WHIRLPOOL: water + agitators; provides MOIST HEAT + DÉBRIDEMENT (turbulence loosens necrotic tissue); 33-40°C; INFECTION RISK (waterborne bacteria); cannot exercise within the tank easily. INDICATIONS for Fluidotherapy: CRPS desensitization, hand/foot post-cast rehab, arthritis pain, peripheral neuropathy desensitization.

├— CARDIOPULMONARY PT

179. The 'Phase II cardiac rehabilitation' program: duration and setting:

A. Home only, 2 weeks

B. SUPERVISED OUTPATIENT CLINIC, typically 36 SESSIONS OVER 12 WEEKS (3×/week) — this is the standard covered by many insurance

systems and supported by evidence as the optimal dose for cardiovascular benefits

C. Inpatient hospital, 6 months

D. Home without supervision

✓ **Answer: B**

💡 **Rationale & Explanation:**

Cardiac rehab Phase II: SETTING: outpatient hospital or clinic-based, with direct supervision by PT/ACSM-certified exercise physiologist. DURATION: 36 SESSIONS over 12 WEEKS (3×/week). SESSIONS CONTENT: aerobic warm-up + steady-state cardio exercise + resistance training + cool-down; education (nutrition, medications, smoking, stress management); risk factor monitoring. OUTCOMES: VO2max increases ~15-25%; risk factor improvement; psychological benefit; REDUCED MORTALITY AND RE-HOSPITALIZATION by ~25%. MONITORING: continuous ECG telemetry, BP, RPE, SpO2 for pulmonary patients. Phase I = inpatient (2-4 days). Phase III = community maintenance. Phase IV = independent exercise.

├─ EXERCISE SCIENCE

180. 'Interval training' for cardiorespiratory rehabilitation:

A. Only for young healthy patients

B. ALTERNATING PERIODS OF HIGHER INTENSITY (near or at target HR range) with LOWER INTENSITY RECOVERY PERIODS — allows cardiac patients to accumulate more HIGH-INTENSITY exercise minutes per session than continuous exercise; improves VO2max faster than moderate continuous exercise with comparable safety

C. Only continuous exercise is evidence-based

D. Maximum intensity throughout

✓ **Answer: B**

💡 **Rationale & Explanation:**

Interval training in cardiac rehab: STRUCTURE: work interval (2-4 minutes at 70-80% HRmax) → recovery interval (2-4 minutes at 40-50% HRmax) → repeat 4-6 times. ADVANTAGES over continuous moderate exercise: allows exposure to HIGHER INTENSITIES (recovery periods allow HR to drop); GREATER VO2MAX IMPROVEMENT (~2× that of moderate continuous in cardiac patients per meta-analyses); PATIENT PREFERENCE: many prefer varied intensity. SAFETY: Level 1 evidence for safety in stable cardiac patients with appropriate monitoring (telemetry, RPE, symptom monitoring). ABSOLUTE CONTRAINDICATIONS to high-intensity intervals: unstable angina, recent acute event (<2 weeks), decompensated HF, severe valve disease, uncontrolled arrhythmias.

├─ PHYSICAL AGENTS

181. 'Sensory threshold for therapeutic TENS': conventional TENS should be applied at:

A. Motor level (producing muscle twitch)

B. SENSORY LEVEL — a comfortable tingling sensation without pain or muscle contraction (sub-motor); this activates large-diameter A-beta fibers for gate control analgesia; the intensity is adjusted to the patient's perception of strong but comfortable tingling

C. Pain level

D. Subthreshold (no sensation)

✓ Answer: B

💡 **Rationale & Explanation:**

TENS sensory level: CONVENTIONAL TENS (80-150 Hz): electrode placement over the painful area or nerve trunk; intensity adjusted to produce a STRONG BUT COMFORTABLE TINGLING SENSATION (sensory level) — NOT PAINFUL, NOT causing muscle twitches. This level selectively activates LARGE-DIAMETER A-BETA FIBERS → spinal dorsal horn gate control → reduces nociceptive signal transmission → analgesia. Starting: turn up the intensity from zero until the patient

first feels tingling (threshold); then increase to 'strong but comfortable' (2-3 times threshold). Reassess during the session — intensity may need to increase due to accommodation.

├— CARDIOPULMONARY PT

182. The 'incentive spirometry' target volume should be:

A. 500 mL universally

B. THE PATIENT'S PRE-OPERATIVE BASELINE (if measured) or 75-80% of age/height/sex-predicted inspiratory capacity — specific targets give the patient a quantifiable goal and provide visual biofeedback for deeper breaths

C. Any volume the patient achieves

D. Whatever the device maximum is

✓ Answer: B

💡 **Rationale & Explanation:**

Incentive spirometry goals: PROTOCOL: 10 slow maximal inspirations/hour while awake; maintain peak inspiration 2-3 seconds (to open collapsed alveoli); breathe normally between reps; cough after to clear secretions. SPECIFIC TARGET: measures and motivates → patients reach deeper inspiration levels with a visual goal. RESEARCH: evidence for IS preventing post-operative complications is MIXED — most effective when COMBINED with early ambulation, breathing exercises, and proper pain management. IS alone is insufficient. The combination approach remains the standard post-operative pulmonary PT protocol.

├— EXERCISE SCIENCE

183. 'Borg RPE 6-20 scale' was designed so that:

A. 20 is the maximum for healthy adults

B. RPE × 10 APPROXIMATES HEART RATE in a typical healthy adult (RPE 10 ≈ 100 bpm; RPE 15 ≈ 150 bpm; RPE 20 ≈ 200 bpm) — this design feature makes it a quick proxy for HR in clinical settings when HR monitoring is unavailable or unreliable

C. Borg preferred the number 20

D. 20 represents maximal exertion only for elderly

✓ Answer: B

💡 **Rationale & Explanation:**

Borg RPE scale design: scale runs 6 to 20. Designed so that RPE × 10 = approximate HEART RATE in healthy individuals. Scale anchors: 6=no exertion; 7=extremely light; 9=very light; 11=light; 13=somewhat hard; 15=hard; 17=very hard; 19=extremely hard; 20=maximal. CLINICAL UTILITY: when HR monitoring is unavailable; when HR is blunted by beta-blockers (RPE is more reliable); when patients lose track of their HR. CAVEAT: the HR-RPE relationship varies significantly between individuals, ages, fitness levels, and medications — use RPE as SUPPLEMENTARY measure alongside HR, BP, and SpO2 in clinical cardiac settings.

├— PHYSICAL AGENTS

184. 'Contraindications' to ultrasound include malignancy because:

A. US causes pain in cancer patients

B. US THERMAL EFFECTS may promote tumor cell proliferation and metastasis by increasing metabolic rate in the malignant tissue, disrupting the thermal gradients that inhibit tumor growth, and potentially stimulating angiogenesis — even in the non-malignant tissue region near the tumor

C. US always causes burns in cancer

D. US reacts with chemotherapy drugs

✓ Answer: B

💡 **Rationale & Explanation:**

US and malignancy: ABSOLUTE CONTRAINDICATION: applying US directly over or near known or suspected MALIGNANT tissue. RATIONALE: thermal elevation in the tumor area may: promote tumor cell metabolism and proliferation; disrupt temperature gradients that naturally limit tumor growth; potentially stimulate local angiogenesis (blood vessel growth); potentially enhance metastatic potential. This risk applies regardless of whether the tumor is primary or metastatic. PRACTICAL: patients undergoing cancer treatment who need PT for musculoskeletal conditions should NOT receive US over the region of known malignancy; US at distant sites (e.g., knee for an unrelated condition in a patient with breast cancer) is considered safe with appropriate clinical reasoning.

├─ CARDIOPULMONARY PT

185. In 'COPD pulmonary rehabilitation', the exercise protocol should include:

A. Aerobic exercise only

B. BOTH AEROBIC EXERCISE (cycling, walking, treadmill — 60-80% peak work rate, 30 min, 3-5×/week) AND UPPER EXTREMITY RESISTANCE TRAINING — upper extremity strength is critical for ADL performance in COPD; dyspnea during arm activities (brushing hair, reaching overhead) is disproportionately severe in COPD because the shoulder girdle muscles are also accessory breathing muscles

C. Only breathing exercises

D. Only strength training

✓ Answer: B

💡 **Rationale & Explanation:**

Comprehensive COPD exercise prescription: AEROBIC: cycling or walking, 60-80% peak work rate, 30 minutes, 3-5 sessions/week; or interval training for severe dyspnea patients (cannot sustain 30 minutes continuous). UPPER EXTREMITY EXERCISE: critical for ADLs — in COPD, shoulder girdle muscles (pectorals, upper trapezius) are

ACCESSORY BREATHING MUSCLES; when they are used for arm activities, they cannot simultaneously assist breathing → DISPROPORTIONATE DYSPNEA with arm activities. UE resistance training: reduces arm activity dyspnea; improves functional performance; prescribe 2-3 days/week. INSPIRATORY MUSCLE TRAINING: additional adjunct for patients with inspiratory muscle weakness. EDUCATION: energy conservation, breathing techniques, inhaler technique.

├─ EXERCISE SCIENCE

186. 'Eccentric training for hamstring strains' — the Nordic Hamstring Curl must be introduced progressively to prevent:

A. Muscle hypertrophy

B. SEVERE DELAYED ONSET MUSCLE SORENESS (DOMS) that interferes with training for 5-7 days — the recommended introduction protocol starts with ONLY 2-3 reps per session in week 1, gradually building to 3×10 by week 9 (Mjolsnes protocol)

C. Strength gains

D. Improving running mechanics

✓ Answer: B

💡 **Rationale & Explanation:**

Nordic hamstring introduction protocol: The NHC produces HIGH ECCENTRIC HAMSTRING FORCES → significant DOMS in unaccustomed athletes → full dosage from week 1 = soreness that prevents normal training for a week. PROPER SCHEDULE (Mjolsnes et al.): Week 1-2: 2 sets × 5 reps. Week 3-4: 3 × 6-8. Week 5-8: 3 × 8-10. Week 9-12: 3 × 10-12 (maintenance). MAINTENANCE: once adapted (8-10 weeks), 1 session/week maintains the injury prevention benefit. ADDITIONAL CUES: keep amortization phase short; focus on the eccentric lowering phase; use a partner or roller board for knee anchoring.

PHYSICAL AGENTS

187. 'Shortwave diathermy' (SWD) heats DEEPER structures than hot packs because:

A. It is simply hotter

B. The ELECTROMAGNETIC FIELD penetrates through soft tissues with relatively low surface heating — converting to heat primarily in deeper, high-resistance tissues (muscle, periosteum); specifically CAPACITIVE applicators heat more superficially (skin, subcutaneous fat); INDUCTIVE applicators heat deeper (muscle primarily)

C. SWD does not produce heat

D. It uses higher frequency than US

✓ Answer: B

💡 **Rationale & Explanation:**

Shortwave diathermy heating depth: SWD (27.12 MHz electromagnetic frequency) can penetrate to 3-5 cm depth. CAPACITIVE APPLICATORS (electrodes plates): the patient's tissue acts as the dielectric between the two plates; generates more DIELECTRIC (fat, superficial tissue) heating. INDUCTIVE APPLICATORS (drum applicator, coil): generates induced eddy currents in CONDUCTING TISSUES (muscle, blood, periosteum) → heat generated in deeper muscle. CLINICAL INDICATIONS: chronic musculoskeletal conditions with deep tissue involvement (hip OA, deep muscle spasm); CONTRAINDICATIONS: metal implants in the field (concentrates energy → burns), pacemakers, pregnancy, malignancy, impaired sensation. SWD heats a larger volume of tissue than US but with less control of the exact target.

CARDIOPULMONARY PT

188. The 'CAT score' (COPD Assessment Test) score of ≥10 indicates:

A. Minimal symptom burden

B. SIGNIFICANT SYMPTOM BURDEN — used in the GOLD ABCD classification to distinguish symptom groups (CAT ≥10 OR mMRC ≥2 = high symptoms group); MCID for CAT after pulmonary rehabilitation = 2-3 points

C. Normal lung function

D. No need for rehabilitation

✓ Answer: B

💡 **Rationale & Explanation:**

CAT score in COPD management: 8-item questionnaire; each item 0-5; total 0-40. INTERPRETATION: 0-10 = low impact; 10-20 = medium; 20-30 = high; 30-40 = very high. GOLD ABCD THRESHOLD: CAT ≥10 = high symptom burden → Group B or Group E depending on exacerbation history. PR OUTCOMES: CAT score improves after pulmonary rehabilitation (MCID = 2-3 points). PT: administer CAT at baseline and after PR program to document treatment effectiveness. Combine with 6MWT, FEV1, mMRC, and functional assessments for a comprehensive COPD rehabilitation outcome battery.

├─ EXERCISE SCIENCE

189. The 'anaerobic threshold' in UNTRAINED individuals occurs at approximately:

A. 80-90% VO2max

B. 50-65% VO2max — at higher intensities, aerobic metabolism cannot meet demand and lactate accumulates; in TRAINED endurance athletes, the threshold occurs at 70-85% VO2max

C. 20-30% VO2max

D. 100% VO2max

✓ Answer: B

💡 **Rationale & Explanation:**

Anaerobic threshold in untrained adults: ~50-65% VO2max. TRAINED ENDURANCE ATHLETES: threshold at 70-85% VO2max (training shifts it rightward). BELOW AT: entirely aerobic (sustainable for extended periods). ABOVE AT: aerobic + anaerobic, lactate accumulates, fatigue develops quickly. AT IDENTIFICATION: VENTILATORY METHOD (VE and VCO2 increase disproportionately to VO2 = ventilatory threshold); LACTATE (blood lactate exceeds 2 mmol/L = first threshold, or 4 mmol/L = MLSS); TALK TEST (at AT, talking becomes difficult). TRAINING INCREASES AT: interval and tempo training most effective. CARDIAC REHAB: exercise prescribed BELOW AT for safety; gradually increases toward AT as conditioning improves.

⊢ PHYSICAL AGENTS

190. The 'inverse square law' for infrared lamps: if the lamp distance is DOUBLED, the intensity becomes:

A. Half

B. ONE-QUARTER of the original intensity (1/d² relationship — intensity falls as 1/distance²: doubling distance = 1/4 intensity; tripling = 1/9 intensity)

C. The same

D. Three-quarters

✓ Answer: B

💡 **Rationale & Explanation:**

Inverse square law: $I \propto 1/d^2$. If distance is doubled (2×): $I = 1/(2^2) = 1/4$ (25% of original). CLINICAL SIGNIFICANCE: small changes in lamp-to-skin distance dramatically change the thermal dose. Standard recommendation: 45-60 cm from the skin for infrared lamps. PRACTICAL: always measure and document the distance; small reductions in distance (patient shifts position, lamp moved closer) can dramatically increase the heat exposure → burn risk.

DOCUMENTATION: record lamp distance, duration, and area treated for reproducible treatments and safety.

CARDIOPULMONARY PT

191. The 'ACSM pre-participation physical activity screening' for MODERATE-INTENSITY exercise: medical clearance is required for:

A. All adults regardless of health

B. Only previously INACTIVE individuals with KNOWN CVD, metabolic, or renal disease who want to start moderate-intensity exercise — asymptomatic individuals without these conditions do NOT need medical clearance to start moderate exercise

C. Everyone over 40 years old

D. Professional athletes only

✓ Answer: B

💡 **Rationale & Explanation:**

ACSM Pre-Participation Screening (2015 update): SIMPLIFIED 3-step: 1) Known CVD/metabolic/renal disease or symptoms? 2) Current physical activity level? 3) Desired exercise intensity? MEDICAL CLEARANCE RECOMMENDED: previously INACTIVE individuals with known CVD/metabolic/renal disease wanting to start VIGOROUS intensity; symptomatic individuals regardless of activity level. NOT REQUIRED: asymptomatic individuals (regardless of risk factors) starting MODERATE intensity; currently ACTIVE asymptomatic individuals at any intensity. KEY CHANGE: eliminated routine medical clearance for ALL adults — it was a barrier to exercise without significant safety benefit for low-risk moderate-intensity exercisers.

EXERCISE SCIENCE

192. **'Work hardening' (functional restoration) differs from general conditioning because:**

A. They are identical

B. Work hardening SPECIFICALLY SIMULATES AND PROGRESSIVELY LOADS OCCUPATION-SPECIFIC TASKS — lifting, carrying, posture tolerance, hand tasks, and endurance at work-equivalent intensity; duration: 4-8 hours/day simulating a workday; criteria: patient can perform all essential job functions at job-equivalent intensity for 8 hours without excessive pain or fatigue

C. Work hardening is less intensive

D. Work hardening focuses only on cardiovascular fitness

✓ Answer: B

💡 **Rationale & Explanation:**

Work hardening: ASSESSMENT: Functional Capacity Evaluation (FCE) determines current physical capacity vs. job demands. PROGRAM: progressive loading of work-specific tasks: LIFTING (floor, shelves, overhead); CARRYING (various distances, loads, heights); POSTURE TOLERANCE (sustained sitting, standing, bending); HAND TASKS (fine motor, grip, pinch); ENDURANCE (full workday tolerance). DURATION: 4-8 hours/day; 4-8 weeks. RTS CRITERIA: all essential job functions at job-equivalent intensity for 8 hours. EVIDENCE-BASED for: reducing disability duration, improving return-to-work rates, reducing re-injury rates vs. passive treatment and general conditioning.

⊢ PHYSICAL AGENTS

193. **'Ice massage' delivers cryotherapy by:**

A. Applying frozen gel packs

B. DIRECT ICE CONTACT with MOVEMENT — freeze water in a paper cup; peel back the paper; apply the ice directly to skin using circular strokes for 5-10 minutes until the area is NUMB (CBAN sequence: Cold → Burning → Aching → Numbness); more intense than static ice packs

C. Using chemical cooling sprays

D. Immersing in cold water only

✓ **Answer: B**

💡 **Rationale & Explanation:**

Ice massage technique: PROCEDURE: freeze water in paper cup; peel back 2-3 cm of paper; apply DIRECTLY to skin using circular strokes at the target area. CBAN SEQUENCE: Cold → Burning/aching → Aching → Numbness. Once NUMB: stretch or exercise (cryo-stretch or cryo-kinetics). ADVANTAGES: direct skin contact → faster temperature reduction; movement of ice creates friction that slightly vasodilates the surface but net result is more rapid deep cooling; effective for small targets (lateral epicondyle, Achilles insertion, specific TrPs). DURATION: strictly 5-10 minutes (more intense than padded ice packs). CONTRAINDICATIONS: open wounds, impaired sensation, vascular disease, Raynaud's.

├─ CARDIOPULMONARY PT

194. 'Dyspnea Breathing Retraining Techniques' for COPD: pursed-lip breathing (PLB) helps because:

A. It slows breathing rate only

B. PLB maintains POSITIVE PRESSURE IN THE AIRWAYS during expiration, preventing PREMATURE AIRWAY COLLAPSE (dynamic airway compression) common in COPD — prolonging expiration, improving gas exchange and reducing air trapping; it also activates the parasympathetic system (reducing accessory muscle use and anxiety)

C. It strengthens the diaphragm only

D. It is merely a distraction technique

✓ **Answer: B**

💡 **Rationale & Explanation:**

Pursed-lip breathing mechanism in COPD: during FORCED EXPIRATION in COPD: the loss of elastic recoil + high expiratory pressures =

DYNAMIC AIRWAY COLLAPSE (airways collapse before all air is exhaled) → AIR TRAPPING → hyperinflation. PLB: pursing the lips creates back-pressure in the airways → the back-pressure STENTS OPEN the collapsible airways during expiration → prevents premature collapse → MORE COMPLETE EXHALATION. ADDITIONAL BENEFITS: slows respiratory rate; reduces ventilation frequency; activates parasympathetic nervous system → reduces anxiety and accessory muscle use; patients commonly discover PLB independently during dyspnea (natural self-learned response). PLB is a simple, no-cost, highly effective breathing technique for COPD management.

├─ EXERCISE SCIENCE

195. 'Maximal Aerobic Speed' (MAS) for interval training is defined as:

A. The fastest sprint speed

B. The MINIMUM RUNNING SPEED at which VO2MAX IS REACHED — training at 100-120% MAS produces the greatest VO2max improvement per unit of training time; estimated from 30-15 Intermittent Fitness Test, Cooper test, or 1-mile time trial

C. Average jogging speed

D. 50% of sprint speed

✓ Answer: B

💡 **Rationale & Explanation:**

MAS in athletic conditioning: DEFINITION: the lowest running speed that requires VO2max to sustain — typically 90-100% VO2max intensity; sustainable for ~3-8 minutes. TRAINING APPLICATION: INTERVAL TRAINING at 100% MAS (60-90 second intervals) → accumulates maximum time near VO2max → superior VO2max gains; at 110-120% MAS (15-30 second intervals) → neuromuscular + aerobic stimulus. MEASURING MAS: 30-15 Intermittent Fitness Test (Buchheit); Cooper test (12 minutes); 1-mile time trial. REHABILITATION APPLICATION: return-to-sport running programs use MAS to set

training intensities; athletes must sustain sport-speed running (often 80-100% MAS for team sports) before return to competition.

PHYSICAL AGENTS

196. 'NMES frequency' for SMOOTH TETANIC MUSCLE CONTRACTION should be:

A. 5-10 Hz (produces individual twitches)

B. 35-50 Hz — at this frequency, individual muscle twitches FUSE into a smooth, sustained tetanic contraction; lower frequencies produce unfused tetanus (tremor-like); used for therapeutic NMES strengthening and FES for gait

C. 100-150 Hz (used for pain only)

D. 1-2 Hz

✓ Answer: B

💡 **Rationale & Explanation:**

NMES frequency for therapeutic contraction: TWITCH: <15 Hz → individual, separate; not useful for strengthening. UNFUSED TETANUS: 15-30 Hz → twitches merge but not smooth (tremor quality). FUSED (SMOOTH) TETANUS: 35-50 Hz → twitches completely fused → smooth, controlled, useful contraction. TARGET FOR NMES-STRENGTHENING AND FES: 35-50 Hz. HIGH FREQUENCY (50-80 Hz): smooth but may accelerate fatigue. VERY HIGH (>100 Hz): pain predominant, less contraction. FES for gait (foot drop stimulators): 30-50 Hz to produce smooth dorsiflexion during swing phase. Below 20 Hz = too tremorous for functional use.

CARDIOPULMONARY PT

197. In cardiac rehabilitation, 'FITT principle' for stable CAD patients recommends:

A. Maximum intensity always

B. F: 3-5 days/week; I: 40-80% HRR (starting 40-60%, progressing to 60-80%); T: 20-60 min/session (start shorter, build to 30-60 min); T: large muscle group aerobic activities (walking, cycling, swimming) PLUS resistance training 2-3 days/week after initial aerobic conditioning

C. Daily maximum effort

D. Only walking at any pace

✓ Answer: B

💡 **Rationale & Explanation:**

Cardiac rehab FITT: FREQUENCY: 3-5 days/week. INTENSITY: start at 40-60% HRR (or 40-60% VO2R); PROGRESS to 60-80% HRR; use RPE 12-14 for beta-blocker patients. Stay BELOW the ischemic threshold (RPP or angina-free HR/BP limit). TIME: start 15-30 min aerobic; progress to 30-60 continuous minutes over 4-8 weeks; interval format if needed initially (5-10 min activity, 2 min rest). TYPE: aerobic large-muscle groups (walking, cycling, rowing, swimming); ADD resistance training 2-3 days/week after initial aerobic conditioning phase. FLEXIBILITY: daily stretching. PHASE III (maintenance): self-managed, ≥150 min/week moderate aerobic exercise.

├─ EXERCISE SCIENCE

198. 'Hypertrophy training' vs. 'strength training': the PRIMARY difference is:

A. Equipment used

B. HYPERTROPHY: 6-12 reps at 67-85% 1RM, 3-4 sets, 60-90 second rest — maximizing metabolic stress and muscle damage for muscle growth; STRENGTH: 1-5 reps at >85% 1RM, 3-5 sets, 2-5 minute rest — training the nervous system for maximal force production

C. Gender of the participant

D. Whether weights or machines are used

✓ Answer: B

💡 **Rationale & Explanation:**

Hypertrophy vs. strength training parameters: HYPERTROPHY (sarcoplasmic + myofibrillar): 6-12 reps; 67-85% 1RM; 3-4+ sets; 60-90 second rest; metabolic fatigue + mechanical tension important. STRENGTH (primarily neural): 1-5 reps; 85-100% 1RM; 3-5 sets; 2-5 minute rest; neural adaptations (recruitment, rate coding, synchronization) predominate. POWER (rate of force development): 3-6 reps; 30-70% 1RM; explosive execution; long rest. In PT: HYPERTROPHY important for rebuilding muscle mass post-surgery or sarcopenia; STRENGTH important for athletes; POWER important for fall prevention and sport performance.

├─ PHYSICAL AGENTS

199. The 'Russian current' is a type of NMES using:

A. 1 Hz, 1 mA

B. 2500 Hz MEDIUM-FREQUENCY AC delivered in 50 Hz BURST FREQUENCY — the medium-frequency carrier reduces skin impedance for more comfortable muscle activation; the 50 burst/second rate creates smooth tetanic contractions; used for strengthening post-surgery and atrophy prevention

C. 50 Hz continuous DC

D. 100 Hz low-voltage

✓ Answer: B

💡 **Rationale & Explanation:**

Russian current parameters: CARRIER FREQUENCY: 2500 Hz (medium frequency — reduces skin impedance, more comfortable deep penetration). BURST FREQUENCY: 50 bursts per second (50 Hz burst rate); each burst lasting 10 ms with 10 ms rest = 50% duty cycle within each burst. SMOOTH TETANIC CONTRACTION at 50 burst/second. STRENGTHENING PROTOCOL: 10 seconds ON: 50 seconds OFF (initially to prevent fatigue); reduce rest ratio as tolerance improves.

Distinguished from standard NMES primarily by: medium-frequency carrier, specific burst pattern. Modern research: comparable efficacy to other NMES waveforms for strengthening — the Russian current's claimed superiority is not consistently supported.

├— CARDIOPULMONARY PT

200. 'Blood pressure response' to resistance exercise: exercise should be STOPPED when:

A. SBP exceeds 150 mmHg

B. SBP >250 mmHg OR DBP >115 mmHg — ACSM guidelines for absolute termination of resistance exercise; resting SBP >180 or DBP >110 are contraindications to starting exercise

C. Any value above resting

D. BP drops below baseline

✓ Answer: B

💡 **Rationale & Explanation:**

BP limits during resistance exercise: RESTING CONTRAINDICATIONS: SBP >180 or DBP >110 → do not start. DURING EXERCISE ABSOLUTE TERMINATION: SBP >250 mmHg or DBP >115 mmHg. CLINICAL PATIENTS: use more conservative limits (typically stop at SBP >200 mmHg in initial cardiac rehab sessions). ISOMETRIC vs. DYNAMIC: isometric produces much greater BP spikes (Valsalva amplifies further) — for HYPERTENSIVE patients: teach proper breathing (exhale during effort, no breath holding); monitor BP during exercise; start with lighter loads. DOCUMENTATION: record resting BP, exercise BP at each session, and any BP-related session modifications.

├— PHYSICAL AGENTS

201. The 'phonophoresis' therapeutic window for drug absorption is approximately:

A. 0-2 minutes after US

B. 15-30 MINUTES POST-APPLICATION — US disrupts the stratum corneum barrier temporarily; applying the topical drug within this window significantly increases percutaneous absorption compared to non-US-treated skin; alternatively, applying the drug as the coupling medium during US treatment (direct phonophoresis) is most effective

C. 24 hours only

D. Immediately before US only

✓ Answer: B

💡 **Rationale & Explanation:**

Phonophoresis timing: US temporarily disrupts the STRATUM CORNEUM lipid bilayer (primary skin barrier), increasing permeability. This disruption PERSISTS for ~30-60 minutes after US application. OPTIMAL DRUG ABSORPTION: apply the drug-containing cream/gel AS THE COUPLING MEDIUM during US treatment (direct phonophoresis — most effective), OR within 15-30 minutes after US. DRUG REQUIREMENTS: must be formulated as a topical (cream, gel, ointment); must be compatible with US transmission. MOST COMMONLY USED: hydrocortisone cream (anti-inflammatory), diclofenac gel (NSAID), lidocaine (local anesthetic). NOTE: evidence for phonophoresis is MODERATE — some studies show enhanced delivery, others show minimal benefit over topical application alone.

├— CARDIOPULMONARY PT

202. In cardiac rehabilitation, 'exertional hypotension' (systolic BP drop >10-20 mmHg during exercise) indicates:

A. Normal cardiovascular response

B. CARDIOVASCULAR COMPROMISE — the heart cannot maintain adequate cardiac output to meet exercise demand; causes include

severe aortic stenosis, hypertrophic cardiomyopathy, LV dysfunction, severe CAD; STOP EXERCISE IMMEDIATELY

C. High cardiovascular fitness

D. Only occurs in hypertensive patients

✓ Answer: B

💡 **Rationale & Explanation:**

Exertional hypotension: NORMAL RESPONSE: SBP RISES progressively with increasing exercise intensity; DBP remains stable or slightly decreases. ABNORMAL: SBP FALLS >10-20 mmHg below resting during exercise — mechanism: failure of cardiac output to keep pace with demand + vasodilated peripheral vessels = BP drops. CAUSES: severe AORTIC STENOSIS (fixed obstruction); HOCM; ISCHEMIC LV dysfunction (exercise-induced ischemia → acute LV failure); severe MITRAL VALVE REGURGITATION; advanced CARDIOMYOPATHY. ACTION: STOP EXERCISE IMMEDIATELY; seated/supine position; monitor vital signs; call for medical assistance; do not leave patient alone. Document and report to referring physician. This is a CONTRAINDICATION to continued exercise until cardiological clearance.

├─ EXERCISE SCIENCE

203. 'Muscle memory' (motor engrams) allows:

A. Muscle tissue to store information

B. Previously learned movement patterns to be RE-ACQUIRED FASTER than originally learned, even after long periods of inactivity — because the stored neural motor program (engram) persists in the basal ganglia, cerebellum, and motor cortex even when muscles weaken or are immobilized

C. Random muscle contractions

D. Only reflex-level movement

✓ Answer: B

💡 **Rationale & Explanation:**

Motor engrams: REPETITIVE PRACTICE creates an engram — a stored motor program in neural circuits (basal ganglia, cerebellum, SMA). After injury, surgery, or prolonged inactivity: the ENGRAM PERSISTS even when the muscles are weak. When rehabilitation begins: re-acquiring the movement is FASTER than original learning. CLINICAL IMPLICATIONS: do NOT restart from zero — the patient 'remembers' how to walk, throw, etc.; early TASK-SPECIFIC PRACTICE reactivates the stored motor program faster than pure strengthening alone; HIGH REPETITION is still needed to restore normal precision after neural disruption. Motor engrams provide the neurological rationale for why task-specific practice (not just strengthening) is essential in all rehabilitation programs.

├— PHYSICAL AGENTS

204. The 'spasm-pain cycle' interrupted by heat therapy involves:

A. Arterial disease causing ischemia

B. MUSCLE SPASM causing ISCHEMIA → metabolite accumulation → PAIN → more muscle guarding → more spasm — heat promotes VASODILATION breaking the cycle by washing out metabolites, raising the pain threshold, and reducing motor neuron excitability

C. Nerve compression causing pain

D. Bone deformity causing pain

✓ Answer: B

💡 **Rationale & Explanation:**

Spasm-pain cycle and heat: CYCLE: muscle spasm → compressed capillaries → reduced blood flow → metabolite accumulation (lactic acid, CO2, bradykinin) → nociceptor stimulation → PAIN → PROTECTIVE MUSCLE GUARDING → more spasm. HEAT BREAKS CYCLE: 1) VASODILATION: dilates blood vessels → increased blood flow → washes out metabolites; 2) RAISES PAIN THRESHOLD: activates thermoreceptors → gate control → reduces pain signal; 3) REDUCES MOTOR NEURON EXCITABILITY: heat decreases alpha motor neuron

firing rate → less muscle tension. COMBINED WITH STRETCHING: heat makes muscle more extensible AND reduces pain → optimal combination for muscle spasm management.

EXERCISE SCIENCE

205. The '1RM test' is used for:

A. Maximum number of reps in 30 seconds

B. Measuring the MAXIMUM WEIGHT a person can lift for exactly ONE complete repetition with proper form — the gold standard for measuring muscular strength; used to calculate training intensities (e.g., 70% 1RM for hypertrophy, 85%+ for strength)

C. Aerobic capacity

D. Flexibility testing

✓ Answer: B

💡 **Rationale & Explanation:**

1RM testing: PROTOCOL: warm-up; start at 50-60% estimated 1RM; progressive increases (5-10%) with 3-5 min rest; achieved within 3-5 attempts. ESTIMATED 1RM from submaximal testing (safer in clinical settings): predict 1RM from reps-to-failure at a submaximal load; 10RM weight ÷ 0.75 ≈ 1RM estimate. TRAINING PERCENTAGES: <30% 1RM = endurance; 30-60% = muscular endurance; 60-80% = hypertrophy; 80-90% = strength; 90-100% = maximal strength/power. CLINICAL USE: in rehabilitation, estimated 1RM from 10RM testing is safer and practical for prescribing progressive resistance training.

PHYSICAL AGENTS

206. 'Skin impedance' in electrotherapy is DECREASED by:

A. Dry skin

B. WET or MOIST SKIN and ELECTROLYTIC GEL — moisture reduces the resistance of the stratum corneum, allowing current to pass more freely with less voltage; gel electrodes provide an ionic medium that significantly reduces interfacial impedance

C. Cold temperature

D. Old age only

✓ Answer: B

💡 **Rationale & Explanation:**

Skin impedance factors: DRY SKIN: high resistance → more voltage required; poor current delivery; more surface heating. MOIST/SWEATY SKIN: low resistance → current passes easily. GEL ELECTRODES: provide an ionic medium between the electrode and skin → significantly reduces interfacial impedance → current passes with less voltage and more comfortably. CLINICAL PRACTICE: skin preparation (cleaning with alcohol wipe) and adequate gel ensures consistent, comfortable current delivery. Without gel: dry coupling → high impedance → potential for concentrated heating at high-impedance points → BURNS. THICK CALLUS (hands, feet): high local resistance → consider using more gel, larger electrode, or water electrode for plantar/palmar surfaces.

├— CARDIOPULMONARY PT

207. The 'COPD Assessment Test' (CAT) is an 8-item questionnaire with a maximum score of:

A. 10

B. 40 — each item scored 0-5; total 0-40; CAT ≥10 = significant symptom burden (used in GOLD ABCD classification); MCID after pulmonary rehabilitation = 2-3 points

C. 100

D. 80

✓ Answer: B

💡 **Rationale & Explanation:**

CAT (Jones et al., 2009): 8 items × 0-5 each = total 0-40. ITEMS: 1) Cough; 2) Phlegm; 3) Chest tightness; 4) Breathlessness going uphill/stairs; 5) Activity limitation at home; 6) Confidence leaving home; 7) Sleep quality; 8) Energy. INTERPRETATION: 0-10 = low impact; 10-20 = medium; 20-30 = high; 30-40 = very high. GOLD THRESHOLD: ≥10 = high symptom burden → Group B or E depending on exacerbation history. PR OUTCOMES: administer CAT at baseline and after PR program to document treatment effectiveness. MCID = 2-3 points.

├─ EXERCISE SCIENCE

208. 'Aerobic capacity' vs. 'anaerobic capacity': a patient who has excellent marathon performance but poor 400m sprint performance demonstrates:

A. Equal capacity in both systems

B. HIGH AEROBIC CAPACITY but relatively LOW ANAEROBIC CAPACITY — training-induced specialization where aerobic adaptations (VO2max, lactate threshold, mitochondrial density) are maximized at some cost to fast-twitch fiber proportion and short-duration anaerobic power

C. Poor health overall

D. Identical profile to a sprinter

✓ Answer: B

💡 **Rationale & Explanation:**

Aerobic vs. anaerobic specialization: ENDURANCE TRAINING ADAPTATIONS: VO2max increases; lactate threshold shifts right; mitochondrial density increases; Type IIx → IIa fiber shift; some reduction in peak anaerobic power. ANAEROBIC TRAINING ADAPTATIONS: improves ATP-PCr and glycolytic enzyme capacity; increases fast-twitch fiber activation; improves RFD; may slightly

reduce aerobic endurance. REHABILITATION: for mixed sports (soccer, basketball): BOTH aerobic and anaerobic systems need conditioning; an athlete cannot return to soccer on aerobic fitness alone — anaerobic conditioning for sprinting and high-intensity bursts is equally important. Periodize rehabilitation to include BOTH systems.

├— PHYSICAL AGENTS

209. The 'placebo effect' in physical modality treatment:

A. Does not exist for physical modalities

B. IS CLINICALLY SIGNIFICANT (30-50% of pain reduction from modalities may be non-specific/placebo) — the patient-therapist relationship, treatment ritual, and patient expectations substantially contribute to outcomes alongside specific treatment effects

C. Only applies to medications

D. Is negligible in PT practice

✓ Answer: B

💡 **Rationale & Explanation:**

Placebo in physical modalities: sham ultrasound (machine turned on but not emitting waves) produces significant pain reduction in RCTs — often 30-50% of what is achieved with real US. NON-SPECIFIC EFFECTS OF: therapeutic encounter (attentive care); patient expectation; treatment ritual. IMPLICATIONS: 1) The therapeutic relationship itself is THERAPEUTIC — invest in patient communication and positive framing; 2) When studies show 'US = sham US,' the whole-study outcome may still be positive (both groups improved); 3) Patient education builds expectation and enhances response; 4) PTs who are warm, attentive, and confident achieve better outcomes even using identical techniques.

├— CARDIOPULMONARY PT

210. **'Pursed-lip breathing' (PLB) in COPD prevents premature airway closure by:**

A. Slowing breathing rate only

B. Maintaining POSITIVE PRESSURE IN THE AIRWAYS during expiration — preventing DYNAMIC AIRWAY COMPRESSION (premature collapse of the small airways before complete exhalation) that leads to air trapping and hyperinflation; PLB extends the expiration time, improves gas exchange, and reduces dyspnea

C. Strengthening the diaphragm

D. Increasing FVC

✓ Answer: B

💡 **Rationale & Explanation:**

PLB mechanism: in COPD during forced expiration: loss of elastic recoil + high expiratory pressures → DYNAMIC AIRWAY COLLAPSE → air trapping → hyperinflation. PLB: pursed lips create back-pressure → STENTS OPEN collapsible airways → more complete exhalation. ADDITIONAL BENEFITS: slows respiratory rate; activates parasympathetic system → reduces anxiety and accessory muscle use. TECHNIQUE: inhale through the nose (2-3 seconds); exhale through GENTLY PURSED LIPS (4-6 seconds, ratio 1:2). Patients commonly discover PLB independently during dyspnea — the PT reinforces and optimizes the technique.

├─ EXERCISE SCIENCE

211. **The 'energy systems during a 400m sprint' draw primarily from:**

A. Purely aerobic

B. A COMBINATION OF ALL THREE SYSTEMS — ATP-PCr (explosive initial 5-10 sec), anaerobic glycolysis (dominant 5-30 sec, large lactate production), and aerobic oxidative phosphorylation (increasingly contributes after 30 sec, ~30-40% by the finish)

C. Pure glycolysis only

D. Only the ATP-PCr system

✓ **Answer: B**

💡 **Rationale & Explanation:**

Energy system contribution — 400m sprint (~45-60 seconds): ALL THREE SYSTEMS are active simultaneously: ATP-PCr provides the explosive start; ANAEROBIC GLYCOLYSIS generates the bulk of energy (producing high blood lactate, severe metabolic fatigue); AEROBIC METABOLISM increases progressively and contributes ~30-40% by the finish. The 400m is uniquely taxing because all three energy systems are stressed at high intensity. For sport-specific conditioning: 400m athletes train all three energy systems. In PT return-to-sport: the energy system model guides exercise intensity and duration prescription for sport-specific rehabilitation.

├— PHYSICAL AGENTS

212. 'Ice massage CBAN sequence': the clinical endpoint for applying therapeutic exercise (cryo-kinetics) after ice massage is:

A. After the Cold stage

B. After the NUMBNESS stage (the 4th stage) — when the area is numb, pain is sufficiently blunted to allow active exercise without discomfort; exercises performed during the numbness window take advantage of the analgesic effect to promote pain-free movement and early rehabilitation

C. After the Burning stage

D. After 10 minutes of application regardless of sensation

✓ **Answer: B**

💡 **Rationale & Explanation:**

CBAN sequence for ice massage: Cold → Burning/aching → Aching → NUMBNESS. TIMING: Cold (0-2 min) → Burning sensation (2-4 min) → Deep aching (4-7 min) → Numbness (7-10 min). CLINICAL ACTION:

once NUMBNESS is achieved, immediately begin THERAPEUTIC EXERCISE (cryo-kinetics). The numbness provides: pain-free movement window; analgesic effect from cold reduces sensory input; the patient can exercise through greater ROM than when pain is present. IMPORTANT: numbness lasts only 15-20 minutes → perform exercises promptly; do not leave the patient unattended during the numb period as they cannot detect pressure injury.

├— CARDIOPULMONARY PT

213. The 'ACSM FITT principle' for COPD patients should be MODIFIED from the general adult recommendation by:

A. No modification needed

B. Adjusting INTENSITY based on SYMPTOM TOLERANCE — COPD patients may not be able to reach target HR due to ventilatory limitation; use DYSPNEA SCALE (Borg CR10, target 3-5) as the primary intensity guide rather than heart rate; allow INTERVAL TRAINING for severe dyspnea patients who cannot sustain continuous exercise

C. Avoiding all aerobic exercise

D. Only strength training

✓ Answer: B

💡 Rationale & Explanation:

COPD exercise prescription modifications: INTENSITY GUIDANCE: DYSPNEA SCALE is more appropriate than HR target for COPD because: some patients cannot reach target HR due to ventilatory limitation (VE/MVV >85%); beta-blockers may blunt HR in co-morbid cardiac patients; dyspnea better reflects the functional limitation in COPD. BORG CR10 TARGET: 3-5 ('moderate to heavy') during aerobic exercise. INTERVAL TRAINING option: patients with severe dyspnea (GOLD 3-4) who cannot sustain 30 minutes continuous: 1-2 min exercise + 1 min rest × multiple rounds → accumulates equal total exercise time with improved tolerance and comparable adaptations.

EXERCISE SCIENCE

214. 'Task-specific training' for occupational rehabilitation (work hardening) focuses on:

A. Generic gym exercises only

B. Progressively loading activities that SIMULATE THE SPECIFIC PHYSICAL DEMANDS OF THE PATIENT'S JOB — gradually increasing lifting capacity, duration, posture tolerance, and work pace to match occupational requirements before return to work

C. Cognitive training only

D. Any exercise program

✓ Answer: B

💡 Rationale & Explanation:

Work hardening: FCE determines current capacity vs. job demands. PROGRAM: progressive loading of WORK-SPECIFIC TASKS: LIFTING (floor, shelves, overhead); CARRYING (distances, loads, heights); POSTURE TOLERANCE (sustained sitting, standing, bending); HAND TASKS (fine motor, grip, pinch); ENDURANCE (full workday). DURATION: 4-8 hours/day; 4-8 weeks. CRITERIA FOR RTW: all essential job functions at job-equivalent intensity for 8 hours without excessive pain or fatigue. EVIDENCE: reduces disability duration, improves return-to-work rates, and reduces re-injury rates vs. passive treatment and general conditioning.

PHYSICAL AGENTS

215. The 'US over scar tissue' technique requires:

A. Only circular strokes

B. A COMBINATION of circular and longitudinal strokes over and around the scar — circular strokes at 2-3 cm/sec over the scar;

longitudinal strokes along the length of the scar; treat 2-3 cm beyond the scar edges (perilesional fibrosis extends beyond the visible scar)

C. Stationary application

D. Only perpendicular to the scar

✓ Answer: B

💡 **Rationale & Explanation:**

US for scar tissue: TECHNIQUE: 1) APPLY COUPLING GEL generously (scars have irregular contours); 2) CIRCULAR STROKES over the scar (slowly, overlapping circles); 3) LONGITUDINAL STROKES along the scar length; 4) TREAT BEYOND SCAR EDGES: perilesional fibrosis extends 2-3 cm beyond visible scar margin → treat this area too; 5) DURATION: ~1-2 min per cm^2 of scar area; 6) PARAMETERS: 1 MHz (deep scars) or 3 MHz (superficial); continuous (for thermal extensibility) or pulsed (for recent wounds); 0.5-1.5 W/cm^2. IMMEDIATELY AFTER US: stretch the scar tissue within the 3-minute thermal window. PULSED US for recently healed wounds (avoid heating fragile new collagen).

├— CARDIOPULMONARY PT

216. The 'VO2max' clinical threshold of 10-12 mL/kg/min in heart failure is significant because:

A. It is the threshold for normal fitness

B. It marks the threshold for HEART TRANSPLANT CANDIDACY CONSIDERATION — patients with VO2max <10-12 mL/kg/min have very poor prognosis with maximal medical therapy and may benefit from transplantation; cardiac rehabilitation aims to improve VO2max above this threshold

C. It is normal for elderly

D. It only applies to athletes

✓ Answer: B

💡 **Rationale & Explanation:**

VO2max and heart failure prognosis: RISK THRESHOLDS: <10-12 mL/kg/min = very poor prognosis → heart transplant consideration; 12-18 mL/kg/min = poor prognosis → intensive cardiac rehab; 18-22 mL/kg/min = moderate prognosis; >22 mL/kg/min = reasonable prognosis for non-transplant management. CARDIAC REHAB GOAL: increase VO2max through aerobic training (typically 15-25% improvement over 12 weeks) → shifts patients to a better prognostic category. COMBINED WITH VE/VCO2: VO2max <10-12 AND VE/VCO2 >45 = strongest combined indicators for transplant candidacy consideration.

├─ EXERCISE SCIENCE

217. 'Functional Movement Training' uses which exercises primarily?

A. Isolated single-joint exercises

B. MULTI-JOINT, MULTI-PLANAR exercises mimicking real-world movement patterns — squats, lunges, reaching, pushing, pulling, carrying, rotating — to train movement quality and neuromuscular control for daily life and sport

C. Pure strength without functional context

D. Passive stretching only

✓ Answer: B

💡 **Rationale & Explanation:**

Functional movement training: trains MOVEMENT PATTERNS (not muscles): squat pattern (sit-to-stand), hip hinge (picking up objects), pushing (chest press → overhead press), pulling (rows), carrying (farmer's carry), rotation (sport, reaching). MULTI-JOINT AND MULTI-PLANAR: real movements never occur in isolation — a tennis forehand involves hip rotation, trunk rotation, shoulder rotation, and wrist snap simultaneously. PROGRESSION: isolated → combined joints → multi-planar → loaded → unstable → reactive → sport/work-specific. Both isolated (early rehabilitation) AND functional exercises have a role — the ratio shifts toward functional as recovery progresses.

PHYSICAL AGENTS

218. The 'laser classes' for PT safety: CLASS 3B therapeutic lasers require:

A. No special precautions

B. WAVELENGTH-SPECIFIC LASER SAFETY GLASSES (OD-rated protective eyewear) for both therapist and patient — the direct beam from a Class 3B laser is hazardous to the eye; diffuse reflected beam is safe; post laser hazard warning signs; do not direct toward reflective surfaces

C. Same precautions as Class 2

D. Only the patient needs glasses

✓ Answer: B

💡 Rationale & Explanation:

Laser classification safety: CLASS 1 = safe under all conditions. CLASS 2 = visible light, safe for brief accidental exposure (blink reflex protects). CLASS 3B = THERAPEUTIC LASER range — DIRECT BEAM HAZARDOUS TO THE EYE. PT MUST: WEAR APPROPRIATE LASER SAFETY GLASSES (wavelength-specific, OD-rated); ensure the PATIENT'S EYES are covered with appropriate glasses or opaque pads; do NOT point at reflective surfaces (mirrors, jewelry, windows — could redirect the beam); post LASER HAZARD WARNING SIGNS. CLASS 4 = surgical lasers (cutting tissue) — always requires full protective measures. Standard sunglasses are NOT laser-safe — use certified wavelength-specific protective eyewear only.

CARDIOPULMONARY PT

219. 'Flow-volume loop' in OBSTRUCTIVE lung disease (COPD, asthma) shows:

A. Normal curve

B. A CONCAVE (scooped) EXPIRATORY LIMB — flow rates decrease more rapidly than normal as lung volume decreases during forced expiration, reflecting dynamic airway collapse; the peak expiratory flow is reduced and reached later in expiration; FEV1/FVC <0.70

C. Elevated flow rates throughout

D. Only reduced peak flow

✓ **Answer: B**

💡 **Rationale & Explanation:**

Flow-volume loop interpretation: NORMAL: triangular expiratory limb with sharp peak (PEF) near full lung volume, then smooth linear decrease. OBSTRUCTIVE (COPD, asthma): EXPIRATORY LIMB CONCAVE (scooped inward) — flows drop precipitously after initial peak, reflecting airway collapse during forced expiration; FEV1/FVC <0.70 (diagnostic criterion). RESTRICTIVE (fibrosis, obesity): the loop is SMALLER and NARROWER (reduced TLC, FVC) but the SHAPE is relatively normal — no concavity. VARIABLE OBSTRUCTION (asthma): loop improves with bronchodilator → reversible obstruction = asthma (vs. COPD which has less improvement — irreversible component).

├─ EXERCISE SCIENCE

220. 'Variable resistance training' (using elastic bands or cam-based machines) attempts to match:

A. A constant load throughout

B. The STRENGTH CURVE of the muscle — increasing resistance where the muscle is STRONGEST and decreasing where it is weakest, providing maximal stimulus throughout the entire range of motion

C. A decreasing resistance throughout

D. Random resistance variations

✓ **Answer: B**

💡 **Rationale & Explanation:**

Variable resistance training: standard free weights provide CONSTANT resistance — but the muscle's strength varies through the range (length-tension relationship). Variable resistance MATCHES THE MUSCLE'S STRENGTH CURVE: ELASTIC BANDS: resistance increases as the band stretches → coincides with the stronger portion of the range. CAM-BASED MACHINES (Nautilus, Keiser): eccentric cam changes the moment arm of the resistance throughout the range. ADVANTAGE: maximally challenges the muscle throughout the full range — avoiding the 'weakest point' limitation of constant resistance. REHABILITATION APPLICATION: elastic bands are ideal for shoulder rotator cuff exercises and early rehabilitation where variable loading through the range is beneficial.

├— PHYSICAL AGENTS

221. 'Galvanic skin response' and skin resistance in electrotherapy:

A. Have no clinical relevance

B. SKIN RESISTANCE VARIES WITH MOISTURE CONTENT — sweaty (low resistance) or dry (high resistance) skin affects current delivery; gel or water is applied to reduce skin impedance and improve current penetration

C. Are tests of peripheral nerve function

D. Only apply to iontophoresis

✓ Answer: B

💡 Rationale & Explanation:

Skin resistance and electrotherapy: DRY SKIN: high resistance (impedance) → more voltage needed to drive same current → poor delivery; potential for localized surface heating. WET/SWEATY SKIN: low resistance → current passes easily. CLINICAL PRACTICE: skin preparation (cleaning) and adequate GEL ensures consistent, comfortable current delivery and prevents burns from concentrated high-impedance points. THICK CALLUS: increased local resistance on hands and feet → use increased gel, larger electrode, or water

electrode. Instructing patients to ensure skin is clean and using fresh gel at each session is an important safety practice.

├— CARDIOPULMONARY PT

222. 'Incentive spirometry' is evidence-based primarily when:

A. Used alone

B. COMBINED WITH EARLY AMBULATION, BREATHING EXERCISES, AND PROPER PAIN MANAGEMENT — IS alone has limited evidence for preventing post-operative pulmonary complications; it is most valuable as a motivational tool with a specific volume target, combined with other post-operative pulmonary PT strategies

C. Used for 24 hours continuously

D. Used only after cardiac surgery

✓ Answer: B

💡 **Rationale & Explanation:**

Incentive spirometry evidence: RESEARCH NOTE: evidence for IS ALONE preventing post-operative pulmonary complications is MIXED — recent meta-analyses show modest benefit with IS alone. IS is primarily effective when COMBINED with: early ambulation (mobilization reduces atelectasis); deep breathing exercises; pain management (pain prevents deep breathing — effective analgesia enables better IS performance); coughing and airway clearance. IS AS A TOOL: provides visual biofeedback and specific volume targets → motivates deeper breaths → improves compliance with deep breathing exercises. The COMBINATION approach remains the standard post-operative pulmonary PT protocol.

├— EXERCISE SCIENCE

223. **'Progressive overload principle': for a beginner, strength improvements are expected every:**

A. 6-12 months

B. 1-2 WEEKS — neural adaptations dominate early (improved motor unit recruitment, inter-muscular coordination) producing rapid strength gains without significant muscle hypertrophy; if improvements don't occur weekly in early training, the program is not challenging enough

C. Only after 1 year

D. Daily

✓ Answer: B

💡 **Rationale & Explanation:**

Strength training adaptation timeline — BEGINNERS: first 2-8 weeks = RAPID STRENGTH GAINS from NEURAL ADAPTATIONS. MEASURABLE WEEKLY IMPROVEMENT (≥5% increase in load) is expected in beginners. Intermediates (2-6 months): hypertrophy begins to contribute; gains continue but more slowly. Advanced (6+ months): gains become smaller, require strategic periodization. DETRAINING: neural adaptations lost first (within 2 weeks of stopping), then hypertrophy (months). ELDERLY PATIENTS: also experience significant strength gains (primarily neural initially) — important to communicate that even elderly patients CAN improve strength with appropriate resistance training. Beginners should see measurable improvements frequently — this maintains motivation and confirms adequate progressive overload.

├— PHYSICAL AGENTS

224. **The 'thermal dose' is determined by:**

A. Equipment brand

B. TEMPERATURE × TIME — the higher the temperature in the target tissue AND the longer it is maintained above the therapeutic threshold

(40°C), the greater the biological effect; tissue damage begins at >45°C sustained for minutes

C. Only the type of modality

D. Patient body weight

✓ **Answer: B**

💡 **Rationale & Explanation:**

Thermal dose: THERAPEUTIC EFFECTS: 40-45°C in target tissue (extensibility, vasodilation, metabolic rate, pain relief). ABOVE 45°C: protein denaturation, cell damage, burns. HOT PACKS (65-80°C): wrapped in 6-8 towel layers → surface temperature reaches ~38-42°C at skin. PRINCIPLE: minimum thermal dose that achieves the therapeutic goal is preferred. HIGH-RISK PATIENTS: diabetes, peripheral vascular disease, impaired sensation, very thin skin → LOWER temperatures and MORE FREQUENT skin checks. DOCUMENT: temperature, number of towel layers, duration, treatment area at each session for reproducible treatments.

├— CARDIOPULMONARY PT

225. The 'mMRC dyspnea scale' Grade 2 means:

A. No breathlessness

B. The patient walks SLOWER THAN PEOPLE OF THE SAME AGE on level ground because of breathlessness, or has to stop for breath when walking at their own pace on level ground — used in GOLD ABCD classification (mMRC ≥2 = high symptom burden)

C. Breathless when dressing

D. Only breathless during exercise

✓ **Answer: B**

💡 **Rationale & Explanation:**

mMRC Dyspnea Scale: Grade 0 = breathless only with strenuous exercise; Grade 1 = short of breath when hurrying or walking up a slight hill; Grade 2 = WALKS SLOWER THAN PEOPLE OF THE SAME AGE

on level ground OR has to stop for breath when walking at own pace; Grade 3 = stops for breath after ~100m or a few minutes of walking on level ground; Grade 4 = too breathless to leave the house OR breathless when dressing/undressing. GOLD THRESHOLD: mMRC ≥2 = HIGH SYMPTOM BURDEN → Group B or Group E. Used alongside CAT for GOLD ABCD classification; simpler and faster than CAT but provides less comprehensive symptom information.

├— EXERCISE SCIENCE

226. 'Muscle power' vs. 'muscle strength': the clinical difference for fall prevention is:

A. They are identical

B. POWER (force × velocity, i.e., explosive rapid force production) declines faster with aging and is a STRONGER PREDICTOR OF FALLS than maximum strength alone — fall prevention programs should include POWER TRAINING (rapid force production) not just slow strengthening

C. Power is less important

D. Strength is always more important

✓ Answer: B

💡 Rationale & Explanation:

Power vs. strength for falls: SARCOPENIA of AGING: maximum strength decreases ~1-2% per year after age 65; POWER decreases ~3-4% per year (declines faster). FALL MECHANISM: most falls require RAPID REACTIVE STEPPING or catch response — these are POWER movements requiring fast force production, not maximum strength. RESEARCH: leg press POWER is a stronger predictor of falls and functional ability in elderly than leg press strength (maximum load). TRAINING IMPLICATION: include POWER exercises in fall prevention programs: sit-to-stand as fast as possible; step-ups at rapid pace; mini-jumps; medicine ball throws — not just slow heavy resistance training.

├— PHYSICAL AGENTS

227. 'IASTM coupling medium' requirements:

A. Only water

B. EMOLLIENTS AND LOTIONS that allow the instrument to GLIDE along the skin surface while the therapist detects UNDERLYING TISSUE TEXTURE — adequate lubrication for smooth movement; but NOT so much that the instrument slides freely (too much lubricant prevents tissue texture detection)

C. Topical NSAIDs always

D. Electrolyte gel only

✓ Answer: B

💡 Rationale & Explanation:

IASTM coupling medium: the instrument must GLIDE along the skin while detecting the underlying tissue texture (normal vs. fibrotic). TOO MUCH LUBRICANT (regular massage oil): instrument slides too freely → no tissue texture detection → poor therapeutic technique. TOO LITTLE: friction burn and skin irritation. APPROPRIATE: emollients/lotions that provide adequate glide while allowing the instrument to 'feel' the resistance of restricted connective tissue below the skin. PETECHIAE: small red dots from capillary rupture from instrument pressure — expected after treatment, indicates effective treatment of restricted tissue. Patient education: petechiae resolve in 24-48 hours; normal soreness for 1-2 days post-treatment.

├— CARDIOPULMONARY PT

228. The 'COPD exacerbation action plan' teaches the patient to:

A. Take double their medications

B. RECOGNIZE early warning signs of exacerbation (increased dyspnea, sputum color/volume change, fever) and initiate the prescribed stepped-up management plan (bronchodilator increase, oral steroids, antibiotics) before the exacerbation worsens to a hospitalization

C. Avoid all activity until resolved

D. Only call the doctor if hospitalized

✓ **Answer: B**

💡 **Rationale & Explanation:**

COPD exacerbation action plan: teaches patients to SELF-MANAGE mild-moderate exacerbations earlier, reducing hospitalization. YELLOW ZONE warning signs: increased breathlessness, change in sputum (more, thicker, discolored), fever, reduced exercise tolerance. ACTION PLAN: 1) Increase SABA (short-acting bronchodilator) use; 2) Start ORAL PREDNISONE (if prescribed — typically 30-40mg × 5 days); 3) Start ANTIBIOTICS (if sputum discolored — physician prescription pre-provided); 4) Contact healthcare provider. EVIDENCE: patients with written action plans have fewer hospital admissions and better QoL. PT ROLE: educate patients on the action plan; ensure understanding; review at each pulmonary rehab session; reinforce adherence.

├─ EXERCISE SCIENCE

229. 'Detraining' or 'deconditioning': cardiovascular fitness (VO2max) begins to decline after:

A. 1-2 years of detraining

B. 2-4 WEEKS of detraining — VO2max decreases by 4-14% within 2-4 weeks; after 3 months VO2max may decline 50% back toward the untrained level; cardiovascular adaptations are lost faster than strength adaptations

C. Only after complete bed rest

D. Never if you were fit

✓ **Answer: B**

💡 **Rationale & Explanation:**

Detraining cardiovascular effects: RAPID DECLINE: VO2max decreases 4-14% within 2-4 weeks. MECHANISMS: plasma volume decreases within days (reducing stroke volume and cardiac output); oxidative enzyme activity decreases; mitochondrial density decreases. After 3 months: VO2max may be 50% back toward untrained values. MUSCLE STRENGTH: slower to decline (neural adaptations lost within 2-4 weeks; hypertrophy maintained for 3+ months). CLINICAL IMPLICATIONS: even brief hospitalization (1-2 weeks) causes significant cardiovascular deconditioning; early mobilization is critical to prevent detraining; patients who are bed-rested for medical reasons need a progressive re-conditioning program post-discharge.

⊢ PHYSICAL AGENTS

230. 'Shortwave diathermy INDUCTIVE applicator' preferentially heats:

A. Subcutaneous fat

B. DEEP MUSCLE TISSUE — inductive applicators (drum/coil applicators) generate EDDY CURRENTS in electrically conductive tissues (muscle, blood, periosteum) → heat generated in MUSCLE primarily; in contrast, capacitive applicators heat more subcutaneous fat and superficial tissues

C. Only the skin

D. Only bony tissues

✓ Answer: B

💡 **Rationale & Explanation:**

SWD inductive applicator: MECHANISM: the coil applicator generates a time-varying magnetic field → induces EDDY CURRENTS in conductive tissues (ionic solutions = muscle, blood, periosteum). HEAT GENERATED IN: high-conductivity tissues = deep MUSCLE, periosteum. LESS HEAT IN: low-conductivity tissues (fat, skin). CLINICAL ADVANTAGE: for deep joint and muscle conditions (hip OA with

significant overlying tissue, deep muscle spasm), inductive SWD heats the therapeutic target (muscle) more efficiently than surface heat (which heats fat predominantly). CONTRAINDICATIONS: metal implants in field (concentrates energy → burns), pacemakers, pregnancy, malignancy, impaired sensation.

├─ CARDIOPULMONARY PT

231. In managing 'chronic heart failure' during exercise, what patient response requires IMMEDIATE session termination?

A. Mild fatigue

B. CHEST PAIN OR PRESSURE, SIGNIFICANT NEW DYSPNEA AT REST, SBP FALL >10-20 mmHg, SIGNIFICANT NEW ARRHYTHMIA ON TELEMETRY, OR CLINICAL SIGNS OF DETERIORATION — these indicate the heart cannot safely meet the current exercise demand and the session must stop immediately

C. Mild sweating

D. Mild HR increase

✓ Answer: B

💡 Rationale & Explanation:

CHF exercise termination criteria: IMMEDIATE STOP: 1) Chest pain or pressure (possible myocardial ischemia); 2) Significant dyspnea at rest (decompensation); 3) SBP FALL >10-20 mmHg (exertional hypotension); 4) SBP >220 mmHg; 5) NEW ARRHYTHMIA on telemetry (PVCs, SVT, AF, heart block); 6) Pallor, diaphoresis, confusion (signs of reduced perfusion); 7) S3 gallop or new crackles (pulmonary edema developing); 8) SpO2 <88% (oxygen desaturation). MONITOR: continuous ECG telemetry in early Phase II; BP before/during/after; RPE and dyspnea at each stage; SpO2 in patients with pulmonary co-morbidities. Document any terminations thoroughly and report to the supervising cardiologist.

EXERCISE SCIENCE

232. The 'glycolytic energy system' (anaerobic glycolysis) produces ATP along with:

A. CO_2 only

B. LACTATE AND HYDROGEN IONS (H+) — the H+ ions lower muscle pH, inhibiting glycolytic enzymes and contractile proteins, causing the burning sensation and fatigue associated with high-intensity exercise; lactate itself is not the primary cause of the burn (it can be used as fuel)

C. ATP directly from food

D. Only water

✓ Answer: B

💡 **Rationale & Explanation:**

Anaerobic glycolysis products: Glucose → 2 ATP + 2 PYRUVATE → (under O_2 deficit) → 2 LACTATE + 2 H+. THE BURN: is primarily from the H+ ions (lowered pH) — not from lactate per se. H+ EFFECTS: inhibit phosphofructokinase (key glycolytic enzyme); inhibit troponin-calcium binding (impairs contractile force); stimulate nociceptors (burning sensation). LACTATE: can be shuttled to other muscles (slow-twitch fibers) and the liver (Cori cycle) for energy — it is NOT simply a waste product but a fuel and signaling molecule (Brooks' lactate shuttle hypothesis). CLINICAL: this understanding explains why HIIT produces lactic acid-related discomfort; it is normal and expected — not harmful unless sustained beyond recovery capacity.

PHYSICAL AGENTS

233. The 'DeLorme progressive resistance method' uses three sets approaching the:

A. Maximum effort from the first set

B. 10RM: Set 1 = 50% of 10RM (warm-up); Set 2 = 75% of 10RM; Set 3 = 100% of 10RM (full therapeutic challenge) — the 10RM is updated each session as strength improves

C. 5RM only

D. Random loads each session

✓ Answer: B

💡 **Rationale & Explanation:**

DeLorme method (1948): PROTOCOL: determine the 10RM; Set 1: 50% × 10RM × 10 reps; Set 2: 75% × 10RM × 10 reps; Set 3: 100% × 10RM × 10 reps. UPDATE: reassess 10RM regularly when current weight becomes easy. OXFORD METHOD (reverse progression): starts at 100%, then reduces — thought to reduce fatigue for weakened muscles. CLINICAL USE: DeLorme is widely taught in PT programs as the foundational progressive resistance training method; has stood the test of time for general rehabilitation strength training. The progressive approach ensures adequate warm-up (Set 1), sub-maximal challenge (Set 2), and full therapeutic challenge (Set 3) within each session.

├─ CARDIOPULMONARY PT

234. 'COPD pulmonary rehabilitation' energy conservation strategies for patients include:

A. No rest during activity

B. Pacing, PRIORITIZING activities, sitting rather than standing where possible, using wheeled walking aids to offload the respiratory muscles, planning activities after bronchodilator medication peak effect, and breathing-coordinated movements to reduce dyspnea during ADLs

C. Maximum effort at all times

D. Only resting between all activities

✓ Answer: B

💡 **Rationale & Explanation:**

Energy conservation in COPD rehabilitation: PACING: spread activities throughout the day; plan rest breaks BEFORE fatigue develops (proactive, not reactive pacing). PRIORITIZING: identify the most important activities for the patient → focus energy on these; delegate or modify less critical tasks. POSITIONING: sitting to shave, brush teeth, cook (reduces energy expenditure by ~20% vs. standing). WHEELED AIDS: wheeled walker (Rollator) allows patients to lean forward and use arm support → shifts some respiratory work from the inspiratory muscles to the arms → reduces dyspnea with ambulation. MEDICATION TIMING: plan exertional activities for the 1-2 hours post-bronchodilator peak effect (when airways are most open). BREATHING COORDINATION: exhale during the EFFORT phase of activities (lifting, pushing, bending).

├─ EXERCISE SCIENCE

235. 'Hypertrophy training' frequency: research shows muscle protein synthesis remains elevated for approximately how long after a training session?

A. 30 minutes

B. 24-72 HOURS — the 'anabolic window' extends for 24-72 hours after resistance training; this is why training each muscle group 2-3 times per week (rather than once per week) may produce superior hypertrophy — the muscle is repeatedly stimulated during the period of elevated protein synthesis

C. 12 hours

D. 7 days

✓ **Answer: B**

💡 **Rationale & Explanation:**

Hypertrophy frequency evidence: MUSCLE PROTEIN SYNTHESIS (MPS) ELEVATION: MPS rises sharply immediately post-training; REMAINS

ELEVATED for 24-48 hours in untrained individuals and 24-72 hours in trained individuals. TRAINING FREQUENCY: training each muscle group 2-3×/week (rather than 1×/week) allows repeated stimulation during the MPS elevation period → potentially superior hypertrophy over time. META-ANALYTIC EVIDENCE: 2×/week training superior to 1×/week for hypertrophy; 3×/week may offer additional benefit for highly trained individuals. PRACTICAL: split routines (training different muscle groups each session) allow 2-3×/week frequency per muscle group while still training daily. REHABILITATION: when rebuilding muscle mass post-surgery, aim for resistance training each muscle group 2-3 times per week.

├— PHYSICAL AGENTS

236. The 'TENS and pacemaker' safety rule:

A. TENS is always safe near pacemakers

B. AVOID TRANSCARDIAC ELECTRODE PLACEMENT (electrodes placed so the current path crosses the heart); placement near the pacemaker device is also avoided unless there has been specific cardiologist consultation and pacemaker testing with the proposed TENS device

C. Only external pacemakers need consideration

D. No restrictions for any pacemaker type

✓ Answer: B

💡 Rationale & Explanation:

TENS and pacemakers: TRANSCARDIAC PLACEMENT = ABSOLUTE CONTRAINDICATION (current crossing the heart → potential interference with pacemaker sensing → inappropriate pacing or pacing inhibition). NEAR THE PACEMAKER DEVICE: also traditionally contraindicated (current might reprogram or damage). MODERN PACEMAKERS: many have filters reducing but not eliminating TENS interference. CURRENT RECOMMENDATION: avoid TENS near pacemakers unless specific cardiologist consultation AND pacemaker testing with the proposed TENS device has been completed. SAFE

APPROACH: treat distal body parts (hands, feet, lower legs) with TENS at a distance from the thorax if the patient's pain is in those regions — but always document cardiologist clearance.

⊢ CARDIOPULMONARY PT

237. The 'Harvard Step Test' assesses cardiovascular fitness by:

A. Directly measuring VO2max

B. Measuring HEART RATE RECOVERY after standardized stepping — faster HR recovery = higher cardiovascular fitness; Physical Fitness Index (PFI) calculated from post-exercise HR values; ADVANTAGE: no equipment beyond a step; DISADVANTAGE: step height and body weight affect metabolic demand

C. Measuring lung function

D. Testing lower extremity strength

✓ Answer: B

💡 **Rationale & Explanation:**

Harvard Step Test: 50cm bench, step up and down 30 steps/minute for 5 minutes. MEASURE HR at: 1.0-1.5 min post-exercise; 2.0-2.5 min; 3.0-3.5 min. PHYSICAL FITNESS INDEX (PFI) = (Duration of exercise in seconds × 100) / (2 × sum of pulse counts). PFI >90 = excellent; 80-90 = good; 65-79 = average; 55-64 = low average; <55 = poor. CHESTER STEP TEST: standardized 15 cm step, 5 progressively faster stages; HR at each stage extrapolated to predicted HRmax; VO2max estimated from HR-workload relationship. Both step tests provide a SUBMAXIMAL cardiovascular fitness estimate suitable for clinical populations where maximal testing is not appropriate.

⊢ EXERCISE SCIENCE

238. 'Aerobic interval training' for rehabilitation: the work-to-rest ratio typically used is:

A. Equal work and rest (1:1)

B. Variable depending on the patient's fitness level — typically starting with 1:2 to 1:3 (30 seconds work: 60-90 seconds rest) for highly deconditioned patients, progressing toward 1:1 or 2:1 as fitness improves; the ACSM recommends matching intervals to the patient's ability to maintain target intensity

C. Always 2:1 work to rest

D. Always 1:4 work to rest

✓ Answer: B

💡 **Rationale & Explanation:**

Aerobic interval training work-to-rest ratios: HIGHLY DECONDITIONED (post-surgery, severe HF, COPD): 1:2 or 1:3 (short work, longer rest) → allows adequate recovery between bouts while still achieving cardiovascular stimulation. MODERATE CONDITIONING: 1:1 → equal work and rest. HIGHER FITNESS: 2:1 or 3:1 → more work time relative to rest. HIGH-INTENSITY INTERVAL (HIIT): 30-60s at 85-95% HRmax : 2-4 min recovery. CLINICAL GUIDELINE: the work interval should be at TARGET INTENSITY (where the benefit occurs); the rest interval should be long enough to allow HR to recover to ~60-70% HRmax before the next work interval. If the patient cannot achieve target intensity in the work interval → rest is too short (increase rest) or work intensity is too high (reduce intensity).

⊢ PHYSICAL AGENTS

239. 'Paraffin bath' temperature and clinical benefits:

A. 52°C for deep heating

B. 52-54°C — LOW THERMAL CONDUCTIVITY of paraffin (slow heat transfer to skin compared to water at the same temperature) allows comfortable application of higher temperature liquid; provides moist

heat; excellent for irregular surfaces (hands, feet); analgesic and increases joint mobility for arthritis

C. 65°C for maximum heat

D. 30°C for cooling

✓ Answer: B

💡 **Rationale & Explanation:**

Paraffin bath: TEMPERATURE: 52-54°C (higher than whirlpool temperature yet comfortable because paraffin has LOW THERMAL CONDUCTIVITY — transfers heat slowly to the skin, avoiding burns). METHOD: 'dip and wrap' — patient dips the hand/foot 8-12 times creating multiple layers; wraps in plastic bag + towel; 15-20 minutes. BENEFITS: moist heat; superior for IRREGULAR SURFACES (knuckles, ankles); analgesic; IMPROVES JOINT MOBILITY (excellent for RA and OA of hands and feet — applies heat specifically to joint surfaces). CONTRAINDICATIONS: open wounds, infections, decreased sensation, vascular insufficiency, acute inflammation. COMPARISON: paraffin is preferred over hot packs for hands/feet because it conforms to irregular surfaces and provides more even heat distribution.

├— CARDIOPULMONARY PT

240. The 'BORG CR10 SCALE' for dyspnea: a score of 5 during cardiac rehabilitation exercise should prompt:

A. Stopping exercise immediately

B. ASSESS the overall clinical picture: if the patient maintains SpO2 ≥90%, no chest pain, no hemodynamic instability, score 5 (heavy) may be acceptable for vigorous training in later rehabilitation phases — but if accompanied by SpO2 <90%, chest pain, or diaphoresis, REDUCE INTENSITY OR STOP

C. Continuing exercise at the same intensity always

D. Prescribing oxygen without physician consultation

✓ Answer: B

💡 **Rationale & Explanation:**

Borg CR10 = 5 interpretation: SCALE: 5 = 'Heavy/strong' dyspnea. In cardiac rehabilitation EARLY PHASES: target dyspnea = 3-4 (moderate). Score 5 = BORDERLINE — decide based on the complete clinical picture: SpO2 ≥90% maintained? No chest pain? No diaphoresis? No pallor? HR within expected range? → Can potentially continue with close monitoring or slight intensity reduction. SpO2 <88-90% → REDUCE INTENSITY or STOP. Any cardiorespiratory warning sign → STOP. In LATER PHASES (well-conditioned cardiac rehab patients): 5-6 can be acceptable for higher-intensity training. DOCUMENTATION: record dyspnea level, SpO2, HR, BP response at each exercise intensity — guides ongoing prescription adjustments.

├─ EXERCISE SCIENCE

241. The 'SAID principle' (Specific Adaptation to Imposed Demand) most directly explains why:

A. All exercise produces identical adaptations

B. A swimmer who trains exclusively in the pool will have superior swimming VO2max but LIMITED CARRYOVER to land-based exercise — the cardiovascular AND neuromuscular adaptations are specific to the training mode, posture, and muscle groups recruited

C. Cross-training always replaces sport-specific training

D. All athletes train the same way

✓ **Answer: B**

💡 **Rationale & Explanation:**

SAID and swimming specificity: CARDIOVASCULAR: swimming VO2max improves with swim training; does NOT fully transfer to running VO2max because: different muscle groups, different postures, different biomechanical demands; some cardiovascular adaptations ARE mode-specific (oxidative capacity of specific trained muscles). NEUROMUSCULAR: stroke efficiency, pull mechanics, kick patterns,

breathing coordination improve specifically for swimming. CARRYOVER: general cardiovascular fitness (heart size, stroke volume) shows some cross-training carryover; specific muscle adaptations do not. PT IMPLICATION: rehabbing a swimmer → introduce swimming-specific exercises early (pull mechanics with bands, kick training) alongside general shoulder strengthening — general strength alone does not fully prepare for swimming return.

├— PHYSICAL AGENTS

242. 'Ultrasound for wound healing' is most effective at which stage?

A. Acute inflammatory stage (0-72 hours)

B. PROLIFERATIVE and REMODELING STAGES — pulsed US (0.5-1.0 W/cm², 20-25% duty cycle) stimulates fibroblast activity, collagen synthesis, and angiogenesis during the proliferative phase (3 days to 3 weeks); continuous US for the remodeling phase can improve collagen alignment and tensile strength

C. Only in the acute stage

D. At any stage, same effect

✓ Answer: B

💡 **Rationale & Explanation:**

US wound healing stages: INFLAMMATORY PHASE (0-72 hours): AVOID continuous US (may disrupt clot formation); pulsed US at very low intensity may be used cautiously to enhance macrophage activity. PROLIFERATIVE PHASE (3 days to 3 weeks): PULSED US (0.5-1.0 W/cm², 20-25% duty cycle, 1 or 3 MHz) — stimulates: fibroblast proliferation and migration; collagen synthesis; angiogenesis (new blood vessel formation). REMODELING PHASE (3 weeks to 2 years): CONTINUOUS or PULSED US — can improve collagen alignment, increase tensile strength of scar tissue; combined with stretching to improve extensibility. CLINICAL PROTOCOL: 3-5 sessions/week during proliferative and remodeling phases; reduce frequency as wound matures.

CARDIOPULMONARY PT

243. 'Diaphragmatic breathing' (abdominal breathing) training in COPD focuses on:

A. Using the chest only

B. Training the PATIENT TO USE THE DIAPHRAGM AS THE PRIMARY BREATHING MUSCLE — reducing the work of the overloaded accessory muscles (sternocleidomastoid, scalenes, pectorals) that are recruited due to diaphragmatic flattening from hyperinflation; decreasing the respiratory rate; improving gas distribution

C. Increasing respiratory rate

D. Only during exercise

✓ Answer: B

💡 **Rationale & Explanation:**

Diaphragmatic breathing in COPD: HYPERINFLATION PROBLEM: in COPD, air trapping causes barrel chest → diaphragm FLATTENS → poor mechanical advantage → diaphragm cannot generate adequate force → ACCESSORY MUSCLES compensate → high energy cost of breathing → respiratory muscle fatigue. TRAINING GOAL: retrain the patient to direct breathing effort toward the abdomen (diaphragm): TECHNIQUE — patient places one hand on the chest, one on the abdomen; with each breath, the ABDOMEN rises, the chest minimally moves; exhale completely before the next breath. BENEFIT: if the patient can reduce accessory muscle use → lower energy cost of breathing → more energy available for physical activity. NOTE: evidence that diaphragmatic breathing training improves clinical outcomes in COPD is MODERATE — it may be less important than aerobic training and airway clearance.

EXERCISE SCIENCE

244. 'Delayed onset muscle soreness' (DOMS) is caused by:

A. Lactic acid accumulation

B. Micro-damage to the MUSCLE FIBER MEMBRANE AND CONNECTIVE TISSUE during ECCENTRIC LOADING — causing localized inflammation and sensitization of nociceptors; peaks at 24-72 hours after unaccustomed eccentric exercise; NOT caused by lactic acid (which clears within 30-60 minutes after exercise)

C. Creatine depletion

D. Glycogen depletion

✓ Answer: B

💡 **Rationale & Explanation:**

DOMS mechanism: ECCENTRIC EXERCISE: muscles produce force while LENGTHENING under load (downloading stairs, lowering weights, running downhill) → high mechanical stress → micro-tears in muscle fiber sarcomeres and connective tissue → local inflammatory response → prostaglandins, bradykinin → nociceptor sensitization → soreness 24-72 hours later. NOT LACTIC ACID: lactic acid clears from muscles within 30-60 minutes of exercise cessation — it is gone long before DOMS develops. TREATMENT: DOMS resolves spontaneously in 3-7 days; light exercise (active recovery) reduces DOMS severity; cold water immersion may reduce DOMS; massage reduces perception; the 'repeated bout effect' — subsequent identical exercise produces less DOMS (protective adaptation).

├— PHYSICAL AGENTS

245. The 'LASER wavelength' for MAXIMUM tissue penetration in therapeutic applications:

A. 630nm (visible red)

B. 780-950 nm (NEAR-INFRARED) — lower absorption by chromophores in this wavelength range allows deeper penetration (1-

3+ cm) compared to visible red light (0.5-1 cm); this range is used for deeper musculoskeletal targets (joints, tendons, deep muscles)

C. 400nm (UV)

D. 1500nm (far infrared)

✓ Answer: B

💡 **Rationale & Explanation:**

Laser penetration depth by wavelength: VISIBLE RED (630-700nm): absorbed by hemoglobin and cytochrome c oxidase in the superficial dermis; penetration depth 0.5-1 cm; best for superficial wound healing, skin conditions. NEAR-INFRARED (780-950nm): lower absorption coefficient for hemoglobin and water → DEEPER PENETRATION (1-3+ cm) → reaches deeper soft tissue targets (tendons, joint capsule, muscle). CLINICAL SELECTION: superficial wounds, trigger points: RED (630-670nm). Deep tendons (Achilles, patellar), joint inflammation, deeper muscle: NEAR-INFRARED (810-830nm). No therapeutic wavelength penetrates more than 3-5 cm in biological tissue.

├─ CARDIOPULMONARY PT

246. 'Cardiac rehabilitation Phase I' (inpatient) begins when:

A. The patient is discharged

B. The patient is HEMODYNAMICALLY STABLE — typically within 24-48 hours of uncomplicated MI — with low-level physical activity (seated exercises, short walks, ADL guidance), education, and risk factor counseling; MONITOR: RPE, HR, BP during all activities

C. 3 months after MI

D. After cardiac catheterization only

✓ Answer: B

💡 **Rationale & Explanation:**

Cardiac rehab Phase I: begins when HEMODYNAMICALLY STABLE: HR <100 bpm; SBP 90-150 mmHg; no new or worsening ischemic

symptoms; no significant arrhythmias. CONTENT: LOW-LEVEL MOBILIZATION (sitting in chair, standing, short corridor walks; initially 3-5 min, 2×/day, progressing); PATIENT EDUCATION: risk factors, medications, warning signs; PSYCHOLOGICAL SUPPORT: anxiety and depression post-MI are common. STOP if: chest pain, dyspnea at rest, SBP fall >10-20 mmHg, new arrhythmia. TARGET: patient discharged able to ambulate 60-100 meters, climb stairs, and self-care independently. Phase II = outpatient supervised exercise (4-12 weeks).

├─ EXERCISE SCIENCE

247. 'Concurrent training' for cardiac rehabilitation patients: should resistance training be added?

A. No — only aerobic exercise

B. YES — resistance training 2-3 days/week SHOULD BE ADDED after the initial aerobic conditioning phase: reduces disability, improves functional capacity, increases muscle mass and metabolic rate, reduces cardiovascular risk factors; safe and evidence-based for stable cardiac patients

C. Only for athletes

D. Only after 6 months of aerobic training

✓ Answer: B

💡 **Rationale & Explanation:**

Resistance training in cardiac rehabilitation: EVIDENCE LEVEL 1: resistance training combined with aerobic exercise produces SUPERIOR outcomes vs. aerobic training alone in cardiac rehabilitation. BENEFITS: preserves muscle mass (prevents sarcopenia from cardiac disease and physical inactivity); improves functional capacity; increases metabolic rate; reduces HR, BP, and RPE for submaximal effort; improves psychological outcomes (confidence, QoL). TIMING: introduce AFTER initial aerobic conditioning (typically weeks 3-4 of Phase II); start with light loads (40-60% 1RM), high reps (12-15), 2-3 sets; avoid Valsalva; focus on proper breathing. SAFETY MONITORING: same as aerobic

(telemetry in early sessions, BP pre/post exercise, symptom monitoring).

├— PHYSICAL AGENTS

248. 'Cold therapy' physiological effects include all of the following EXCEPT:

A. Reduced nerve conduction velocity

B. INCREASED BLOOD FLOW after initial vasoconstriction — after 20-30 minutes of cold application, the HUNTING RESPONSE (Lewis reaction) occurs with cyclic vasodilation to prevent tissue freezing; this is a SECONDARY effect of prolonged cooling

C. Decreased metabolic rate

D. Decreased muscle spasm

✓ Answer: B

💡 **Rationale & Explanation:**

Cold therapy effects: PRIMARY: vasoconstriction (reduced blood flow); decreased nerve conduction velocity (analgesia); decreased metabolic rate (reduced enzyme activity, edema formation); decreased muscle spindle activity (reduced spasm). HUNTING RESPONSE (Lewis reaction): after 15-20 minutes of continuous cold application → CYCLIC VASODILATION (vessels dilate briefly to warm the tissue and prevent frostbite) → followed by re-constriction → repeating pattern. This is a PROTECTIVE reflex, not a therapeutic goal. CLINICAL: the hunting response explains why prolonged ice application (>20-30 min) may paradoxically increase blood flow — for therapeutic analgesia and edema control, 10-20 minute applications are typically used.

├— CARDIOPULMONARY PT

249. The '6MWT' for COPD: a distance of less than 350 meters is clinically significant because:

A. It is only relevant for athletes

B. It is associated with INCREASED MORTALITY RISK, higher hospitalization rates, and POOR PROGNOSIS in COPD; distances <350m predict poor outcomes; the MCID for 6MWT in COPD is approximately 25-35 meters for meaningful clinical change

C. It means the patient cannot participate in PR

D. It is the normal value for COPD

✓ Answer: B

💡 Rationale & Explanation:

6MWT prognostic significance in COPD: LOW 6MWT DISTANCE (<350m) is associated with: increased all-cause mortality; increased COPD-related hospitalization; worse health-related quality of life. BODE INDEX includes 6MWT: Body mass index, Obstruction (FEV1), Dyspnea (mMRC), Exercise capacity (6MWT) — predicts 4-year survival in COPD. PULMONARY REHABILITATION TARGETS: achieving 6MWT improvement >MCID (25-35m) after PR demonstrates clinically meaningful cardiovascular conditioning. TARGET: most PR programs aim for improvement of at least 50-60m over 12 weeks for COPD patients who complete the program. Patients starting with <200m 6MWT may need supervised sessions with SpO2 monitoring and supplemental O2.

├— EXERCISE SCIENCE

250. 'Resting metabolic rate' (RMR) represents approximately what percentage of total daily energy expenditure in a sedentary adult?

A. 20-30%

B. 60-75% — RMR accounts for the majority of daily caloric expenditure in sedentary individuals (basal cellular processes: brain,

heart, kidneys, liver, thermoregulation, cell maintenance); physical activity accounts for 15-30%; thermic effect of food ~10%

C. 10-15%

D. 80-90%

✓ Answer: B

💡 **Rationale & Explanation:**

Total daily energy expenditure components: RMR (RESTING METABOLIC RATE): 60-75% of total daily energy expenditure in sedentary individuals (50-60% in very active individuals). PHYSICAL ACTIVITY: 15-30% (highly variable — the most modifiable component). THERMIC EFFECT OF FOOD (TEF): ~10% (energy required to digest, absorb, and metabolize nutrients). CLINICAL SIGNIFICANCE: a sedentary cardiac patient has most of their daily energy expenditure coming from RMR (not activity). Exercise training: increases muscle mass → increases RMR; the long-term RMR increase from resistance training contributes to weight management even on rest days. In weight management programs: increasing both RMR (resistance training) AND physical activity (aerobic exercise) creates a larger and more sustainable caloric deficit than either alone.

├─ PHYSICAL AGENTS

251. The 'piezoelectric effect' in ultrasound transducers:

A. Is the heating of metal

B. Converts ELECTRICAL ENERGY into MECHANICAL VIBRATIONS (and vice versa) — certain crystals (lead zirconate titanate/PZT) deform mechanically when an alternating voltage is applied, producing ultrasonic waves at the applied frequency

C. Controls the frequency display

D. Increases the beam area

✓ Answer: B

💡 **Rationale & Explanation:**

Piezoelectric effect: PZT (lead zirconate titanate) crystal in the transducer: when an alternating electrical voltage is applied → the crystal VIBRATES MECHANICALLY at the same frequency → produces ultrasonic waves. Conversely, when the crystal is mechanically deformed → it generates an electric charge (used in diagnostic US receivers to detect returning echoes). In therapeutic US: the electrical generator applies a high-frequency alternating voltage → the PZT crystal vibrates → produces therapeutic US at that frequency (1 MHz or 3 MHz). The crystal must be kept from excessive heating (caused by stationary application or prolonged use) — which is another reason for continuous transducer movement.

├— CARDIOPULMONARY PT

252. 'Cardiac rehabilitation Phase III/IV' (maintenance phase) targets:

A. Return to Phase II

B. LONG-TERM INDEPENDENT EXERCISE MAINTENANCE — the patient continues cardiovascular exercise independently (community gym, home exercise, walking groups) at least 150 min/week of moderate-intensity aerobic activity; PT transitions to periodic monitoring, home program updates, and motivational support

C. Weekly supervised gym sessions indefinitely

D. Only stretching exercises

✓ Answer: B

💡 **Rationale & Explanation:**

Cardiac rehab Phase III/IV: PHASE III: community-based supervised exercise (gym, community center, walking groups); PT involvement decreases; patient increasingly self-directed; monthly or quarterly PT check-ins. PHASE IV: fully INDEPENDENT EXERCISE maintenance; patient manages their own cardiac exercise program; PT available for problem-solving (new symptoms, exercise program modification, return after illness). GOAL: maintain cardiovascular fitness gains lifelong; prevent deconditioning and disease progression; maintain

motivation. OUTCOMES: Phase III/IV participants have lower cardiac mortality and re-hospitalization rates than those who stop after Phase II. Philippine context: Phase III community programs are limited — PT advocacy for community-based cardiac exercise groups is an important healthcare development goal.

├─ EXERCISE SCIENCE

253. 'Training load monitoring' in sport rehabilitation uses the ACWR (Acute:Chronic Workload Ratio). The 'danger zone' for injury risk is ACWR:

A. 0.8-1.3 (training monotony zone)

B. Above 1.5 (excessive acute load relative to the chronic base) — the athlete has ramped up training too quickly relative to their conditioned baseline, significantly increasing injury risk; below 0.8 = undertraining; 0.8-1.3 = sweet spot (safe and adequate training)

C. Below 0.5

D. Exactly 1.0

✓ Answer: B

💡 **Rationale & Explanation:**

ACWR and injury risk: ACWR = Acute load (last 7 days) / Chronic load (rolling 28-day average). SAFE ZONE (0.8-1.3): adequate training stimulus relative to the athlete's current fitness base; injury risk is lowest. DANGER ZONE (>1.5): the athlete is doing much more than they are conditioned for → injury risk spikes (2-4× higher injury risk in some studies). UNDERTRAINING (<0.8): inadequate stimulus → deconditioning. RETURN-TO-SPORT APPLICATION: when returning an athlete from injury, the chronic load is low (from time off) → the acute load must be CAREFULLY GRADUATED to keep ACWR in the safe zone; resist the temptation to rush the athlete back to full training too quickly. This is a key concept in modern sports PT and return-to-sport programs.

⊢ PHYSICAL AGENTS

254. 'TENS for chronic pain' — the ADAPTATION PROBLEM with conventional TENS (high frequency) is:

A. It always works long-term

B. The analgesic effect DIMINISHES OVER TIME (days to weeks) due to NEUROADAPTATION — the nervous system adapts to the repeated high-frequency sensory input and the gate control effect reduces; addressed by varying frequency, using BURST mode, or alternating with acupuncture-like TENS

C. TENS causes addiction

D. It only works for acute pain

✓ Answer: B

💡 **Rationale & Explanation:**

TENS adaptation in chronic pain: CONVENTIONAL TENS (80-150 Hz): the gate control effect is mediated by A-beta fiber activation; with REPEATED DAILY USE, the nervous system adapts (habituates) → the analgesic effect diminishes. SOLUTIONS: 1) VARY the frequency (use different frequencies on different days); 2) BURST TENS: combines gate control (within-burst high frequency) with opioid release (between-burst low frequency) → both mechanisms used simultaneously → slower adaptation; 3) ACUPUNCTURE-LIKE TENS (1-4 Hz): opioid-mediated mechanism; different receptor system; less prone to rapid adaptation; 4) TAKE BREAKS from TENS: allow the system to 'reset' by taking 1-2 days off per week. For CHRONIC PAIN management: TENS is most effective as a COMPONENT of a comprehensive pain management program, not as the sole intervention.

⊢ CARDIOPULMONARY PT

255. The 'FEV1/FVC ratio' in normal healthy adults is approximately:

A. 50%

B. ≥70% (≥0.70) — this ratio indicates that in normal lungs, at least 70% of the forced vital capacity can be exhaled in the first second; below 70% post-bronchodilator = OBSTRUCTIVE PATTERN (COPD or asthma); a reduced FVC with preserved or increased ratio = RESTRICTIVE PATTERN

C. 80%

D. 90%

✓ Answer: B

💡 **Rationale & Explanation:**

FEV1/FVC ratio interpretation: NORMAL: ≥0.70 (≥70%) in adults; may be higher (>0.80) in younger adults. POST-BRONCHODILATOR FEV1/FVC <0.70 = OBSTRUCTIVE PATTERN: airflow is limited (COPD confirmed if clinical context appropriate); GOLD staging then uses FEV1% predicted to determine severity. FVC REDUCED WITH NORMAL OR HIGH FEV1/FVC RATIO = RESTRICTIVE PATTERN: both lungs are smaller (fibrosis, obesity, neuromuscular weakness limiting effort) but the airway obstruction is absent. MIXED PATTERN: both FVC reduced AND FEV1/FVC <0.70 = combined obstruction and restriction. Simple memory: OBSTRUCTION = FEV1/FVC LOW (blows out <70% in 1 sec); RESTRICTION = FVC LOW but ratio preserved.

├— EXERCISE SCIENCE

256. 'Eccentric training' produces higher muscle forces than concentric because:

A. Fewer motor units are used

B. During eccentric contraction, the CROSS-BRIDGE cycling is slower and the TITIN PROTEIN provides ADDITIONAL PASSIVE ELASTIC FORCE — the combination of active cross-bridge force and titin's spring-like

contribution allows eccentric forces to exceed isometric maximum force by ~20-30%

C. More oxygen is consumed

D. The muscle is shorter

✓ Answer: B

💡 **Rationale & Explanation:**

Eccentric force production mechanism: In ECCENTRIC (lengthening) contraction: 1) CROSS-BRIDGE CYCLING: active cross-bridges resist the lengthening; they can generate force while being stretched (higher force per cross-bridge than concentric); 2) TITIN: the giant sarcomeric protein acts as an elastic spring — as the sarcomere is stretched, titin stores elastic energy and contributes passive restoring force → ADDS to active cross-bridge force. RESULT: eccentric force can exceed isometric maximum force (the highest concentric force possible) by ~20-30%. CLINICAL IMPLICATION: eccentric exercises produce the highest mechanical loads on the muscle-tendon unit with relatively LESS METABOLIC COST (fewer motor units needed for the same force). This explains why eccentric training is: more effective for tendon loading, more likely to cause DOMS, and better for building structural tendon adaptation.

⊢ PHYSICAL AGENTS

257. The 'spinal cord stimulation' (SCS) for chronic pain in PT context — the PT must:

A. Ignore SCS devices

B. BE AWARE that SCS devices (like pacemakers) may be affected by electrical modalities — TENS, NMES, and electrical muscle stimulation should NOT be applied over or near the SCS device or in the thoracic/lumbar spine region without manufacturer consultation and neurosurgeon clearance

C. Apply TENS directly over the SCS site

D. Only use heat

✓ **Answer: B**

💡 **Rationale & Explanation:**

SCS and electrotherapy safety: SPINAL CORD STIMULATORS: implanted epidural electrodes connected to a pulse generator (similar to a pacemaker in concept). ELECTRICAL MODALITY CONCERNS: NMES, TENS, diathermy, and ionizing radiation can potentially: interfere with SCS device function; reprogram the device; damage the device or leads; cause unintended stimulation. SAFETY PROTOCOL: always identify if a patient has an SCS (ask about implanted devices); consult with the NEUROSURGEON/NEUROMODULATION TEAM and DEVICE MANUFACTURER before applying any electrical modality; apply MRI contraindication-equivalent precautions; document the device type and consultation. Non-electrical PT (exercise, manual therapy, hydrotherapy) can generally be safely used with SCS — but verify with the treating neurosurgeon.

├— CARDIOPULMONARY PT

258. 'Dyspnea index' (breathing reserve) during maximal exercise: a normal breathing reserve is:

A. 0-5%

B. 15-30% — the patient uses only 70-85% of their MVV (maximal voluntary ventilation) at peak exercise; this represents the VENTILATORY RESERVE available; <15% reserve = ventilatory limited (breathing is the limiting factor); >30% = likely cardiovascular limited

C. 50-60%

D. 100%

✓ **Answer: B**

💡 **Rationale & Explanation:**

Breathing reserve at peak exercise: normal healthy individuals at peak exercise: PEAK VE = approximately 70-85% of MVV → BREATHING

RESERVE = 100% - 70-85% = 15-30%. This reserve means the respiratory system is NOT the limiting factor — the cardiovascular or muscular systems limit exercise first. VENTILATORY LIMITED: peak VE/MVV >85% (less than 15% breathing reserve) → the patient is using nearly all their breathing capacity → seen in SEVERE COPD, severe asthma, pulmonary fibrosis. CARDIOVASCULAR LIMITED: breathing reserve >30% even at peak exercise → the lungs have plenty of capacity but the heart/circulation limits further exercise. This distinction helps identify whether PR should focus on: ventilatory (breathing training, bronchodilation) vs. cardiovascular (aerobic conditioning, strength training) rehabilitation.

⊢ EXERCISE SCIENCE

259. 'Plyometric training' principles: the AMORTIZATION PHASE is:

A. The landing phase

B. The BRIEF TRANSITION PERIOD BETWEEN the eccentric (landing/braking) phase and the concentric (takeoff) phase — also called the coupling time; shorter amortization → more elastic energy stored in the muscle-tendon unit is used in the concentric phase → better power output; longer amortization = energy is lost as heat

C. The takeoff phase

D. The rest period between jumps

✓ Answer: B

💡 Rationale & Explanation:

Amortization phase in plyometrics: STRETCH-SHORTENING CYCLE (SSC): ECCENTRIC (landing) → AMORTIZATION (transition) → CONCENTRIC (takeoff). AMORTIZATION: the brief eccentric-concentric transition. KEY PERFORMANCE FACTOR: SHORTER amortization time → more stored elastic energy is available for the concentric phase (like a compressed spring releasing quickly). LONGER amortization → elastic energy dissipates as heat → less available for the concentric push-off → less power. TRAINING: plyometric exercises train the athlete to

MINIMIZE amortization time (be 'stiff' and reactive at the joint); coaching cue: 'Be like a basketball bouncing off the floor, not a clay ball.' CLINICAL RELEVANCE: ACL rehabilitation — controlled plyometric progression teaches the neuromuscular system to handle the SSC safely before return to cutting/jumping sports.

├— PHYSICAL AGENTS

260. 'US at the bone-soft tissue interface' — the GREATEST RISK is:

A. Muscle heating

B. PERIOSTEAL HEATING from STANDING WAVE formation — the bone reflects the US beam, creating an interference pattern that concentrates energy at the periosteum; PREVENTION: continuous transducer movement at all times; NEVER apply US stationary over bony prominences; extra caution at: medial malleolus, tibial crest, dorsal foot, radial styloid, lateral epicondyle (minimal overlying soft tissue)

C. Ligament damage

D. Nerve compression

✓ Answer: B

💡 **Rationale & Explanation:**

Standing wave and periosteal heating: at the BONE surface: the US wave is partially REFLECTED; the reflected wave interferes with the incoming wave → STANDING WAVE PATTERN → energy concentration at ANTINODES (fixed points of maximum pressure) → intense focal PERIOSTEAL HEATING. The periosteum is EXTREMELY PAIN-SENSITIVE (one of the most innervated tissues in the body). CLINICAL SIGNAL: SHARP, BURNING, DEEP PAIN during US = periosteal heating = MOVE THE TRANSDUCER IMMEDIATELY. Prevention: continuous movement; never stationary treatment; extra caution over bony prominences with thin soft tissue coverage; reduce intensity if the patient reports any deep pain.

⊢ CARDIOPULMONARY PT

261. The '6-minute walk test' standard protocol requires:

A. A treadmill

B. A FLAT, STRAIGHT CORRIDOR of at least 30 meters — the patient walks as far as possible in 6 minutes at their own pace (they may slow down or stop if needed); standardized verbal encouragement is given at specific times; distance recorded in meters; CONTRAINDICATIONS: resting HR >120, SBP >180, DBP >100, unstable angina

C. A slope

D. Maximum effort at all times

✓ Answer: B

💡 **Rationale & Explanation:**

6MWT protocol: SETTING: flat, hard surface corridor ≥30m (ideally 30m with marked turnaround points). PROCEDURE: patient walks as FAR AS POSSIBLE in 6 minutes; may SLOW DOWN or STOP AND REST if needed (clock keeps running); standardized verbal encouragement at 1, 2, 3, 4, 5 minute marks ('You are doing well, X minutes remaining'). MEASURE: total distance in meters. SAFETY STOP: if SpO2 <85%, chest pain, severe dyspnea, leg cramps, staggering, pale or diaphoretic appearance → STOP the test immediately. PRE-TEST: rest for 10 minutes; measure resting HR, BP, SpO2; Borg dyspnea. POST-TEST: immediately measure HR, BP, SpO2, Borg dyspnea. TWO TESTS: when used for research or formal assessment, two walks (with 1-hour rest between) are recommended — the second walk is typically longer (learning effect); use the better result.

⊢ EXERCISE SCIENCE

262. The 'aerobic training threshold' for ELDERLY (65+ years) patients is:

A. Same as young adults (60-70% HRmax)

B. LOWER — as low as 40-50% HRR (Heart Rate Reserve) or 40-60% VO2R can produce significant cardiovascular improvements in very deconditioned elderly patients; RPE 11-13 (light to somewhat hard) is appropriate for most; ACSM recommends starting at 40-60% HRR and progressing to 60-75% as fitness improves

C. 80% HRmax always

D. 100% HRmax for best results

✓ Answer: B

💡 **Rationale & Explanation:**

Exercise training threshold in elderly: TRAINING PRINCIPLE: the stimulus needed to improve cardiovascular fitness is RELATIVE TO THE INDIVIDUAL'S BASELINE — highly deconditioned elderly patients respond to lower absolute intensities. ACSM GUIDELINES FOR OLDER ADULTS: MODERATE INTENSITY: 40-59% HRR or VO2R; RPE 12-13; VIGOROUS: 60-89% HRR or VO2R; RPE 14-17. STARTING RECOMMENDATION: 40-60% HRR for initially inactive elderly → progress as fitness improves. SPECIAL CONSIDERATIONS: age-predicted HRmax (220-age) is less accurate in elderly; use RPE as primary intensity guide; monitor for orthostatic hypotension; ensure adequate warm-up and cool-down; balance and fall prevention are critical concurrent concerns.

├— PHYSICAL AGENTS

263. 'Hot pack temperature' monitoring: the pack should be applied when the surface temperature at the patient's skin is approximately:

A. Body temperature (37°C)

B. 38-42°C — within the therapeutic range that provides benefit without burn risk; achieved by using the appropriate number of insulating towel layers (typically 6-8 layers) between the hot pack (65-80°C) and the skin

C. 50°C directly

D. 65°C directly

✓ **Answer: B**

💡 **Rationale & Explanation:**

Hot pack skin temperature target: DIRECT HOT PACK TEMPERATURE: 65-80°C in the hydrocollator (too hot to apply directly). INSULATION: 6-8 layers of toweling reduce the surface temperature delivered to the skin to approximately 38-42°C. MONITORING: check skin every 5 minutes — look for: mottling (irregular red patches — sign of developing thermal injury); blistering; excessive redness; patient reports of excessive heat. PATIENTS AT HIGHER RISK (requiring more insulation): impaired sensation; peripheral vascular disease; diabetes; elderly (thin skin); very young children; obese patients (monitoring may be less reliable). SAFETY PRINCIPLE: if in doubt, ADD more towel layers — it is always possible to remove insulation if the patient needs more heat; a burn cannot be undone.

├— CARDIOPULMONARY PT

264. The 'Borg Category Ratio 10 (CR10)' target during AEROBIC exercise in pulmonary rehabilitation:

A. 1 (very light)

B. 3-5 (MODERATE TO HEAVY) — this intensity produces the cardiovascular training adaptation while being tolerable for patients with pulmonary disease; below 3 = insufficient stimulus; above 7 = too intense for most PR patients (risk of dyspnea crisis and patient dropout)

C. 0 (nothing)

D. 10 (maximal)

✓ **Answer: B**

💡 **Rationale & Explanation:**

Borg CR10 target in pulmonary rehab: BORG CR10 SCALE: 0=nothing, 1=very light, 2=light, 3=MODERATE, 4=somewhat heavy, 5=HEAVY, 6=, 7=very heavy, 8=, 9=very very heavy, 10=MAXIMAL. TARGET FOR AEROBIC EXERCISE IN PR: 3-5 (moderate to heavy). This corresponds to: the patient can speak in short sentences but not full sentences; significant breathlessness but controllable; can maintain the intensity for 20-30+ minutes with practiced pacing. PRACTICAL MONITORING: assess Borg CR10 at the start, midpoint, and end of aerobic exercise; adjust intensity to maintain 3-5. For INTERVAL TRAINING in severe COPD: work phases may reach 5-7 briefly; recovery phases return to 2-3.

⊢ EXERCISE SCIENCE

265. 'Blood pressure response' to AEROBIC exercise: normal systolic BP increase per MET of exercise intensity is approximately:

A. 1-2 mmHg/MET

B. 10-12 mmHg INCREASE per MET — so going from 1 MET (rest) to 8 METs (vigorous aerobic) would be expected to increase SBP by approximately 70-90 mmHg above resting; DBP remains stable or decreases slightly (peripheral vasodilation)

C. 30-40 mmHg/MET

D. 5 mmHg/MET

✓ Answer: B

💡 **Rationale & Explanation:**

Aerobic exercise BP response: NORMAL: SBP increases approximately 10-12 mmHg per MET increase in workload. Example: resting SBP 120 mmHg; at 8 METs (vigorous exercise) → expected SBP ≈ 120 + (8-1) × 10 = 190 mmHg (approximately). DBP response: should remain stable or DECREASE slightly (peripheral vasodilation from active muscles reduces total peripheral resistance). ABNORMAL RESPONSES: EXCESSIVE SBP RISE: >220 mmHg at submaximal intensity = exertional hypertension (requires investigation); INADEQUATE SBP RISE: flat or

decreasing SBP = exertional hypotension (serious sign of cardiac compromise); ELEVATED DBP: DBP rising >10 mmHg with exercise = concerning for cardiovascular disease. PT MONITORING: measure BP at rest and at peak exercise during the initial sessions; document the baseline exercise BP response to guide future intensity prescription.

├─ PHYSICAL AGENTS

266. 'Therapeutic US for calcific tendinitis' — the primary proposed mechanism:

A. Dissolves calcium directly

B. CAVITATION EFFECTS may help disperse calcific deposits by creating mechanical disruption at the calcification interface; continuous US also provides thermal effects that may improve tissue extensibility; however, evidence is MODERATE — US is often used as one component of a multimodal approach alongside physiotherapy and corticosteroid injection

C. Increases calcium deposition

D. Only provides pain relief temporarily

✓ Answer: B

💡 **Rationale & Explanation:**

US for calcific tendinitis: PROPOSED MECHANISMS: 1) CAVITATION: stable and possibly inertial cavitation at the calcification-tissue interface → mechanical disruption of the calcium deposits; 2) THERMAL EFFECTS: heating the peritendinous tissue improves extensibility and vasodilation; 3) NON-THERMAL: acoustic streaming may alter calcium crystal structure. CLINICAL PROTOCOL: continuous US, 1 MHz (for deeper shoulder rotator cuff), 1.5-2.0 W/cm², 8-10 minutes directly over the calcification site; typically 10-15 sessions. EVIDENCE: moderate — some RCTs show significant improvement vs. sham US or physiotherapy alone; others show comparable outcomes. MULTIMODAL: US is most effective as PART OF A PROGRAM (manual therapy, strengthening, exercise) rather than in isolation.

CARDIOPULMONARY PT

267. The 'sternum' healing timeline after cardiac surgery: weight-bearing precautions are typically relaxed at:

A. 2 weeks post-op

B. 6-8 WEEKS post-operatively — when secondary bone healing of the sternotomy is considered adequate for bilateral UE loading; progressive return to upper body resistance training occurs between 8-12 weeks; full bilateral UE loading (bilateral push-ups, bilateral overhead lifting) typically at 12+ weeks

C. 2 days post-op

D. 1 year post-op

✓ Answer: B

💡 **Rationale & Explanation:**

Sternotomy healing and exercise progression: STERNUM HEALS BY SECONDARY BONE HEALING (like a fracture): wires hold the sternal halves together while callus forms. TIMELINE: 0-6 weeks: STRICT PRECAUTIONS (no bilateral arms above 90°, no pushing/pulling >2-5 kg bilaterally); 6-8 weeks: GRADUAL PROGRESSION (bilateral arm activities with increasing loads; bilateral shoulder elevation to 90°; bilateral chest press with light loads); 8-12 weeks: MOST BILATERAL ACTIVITIES permitted (light bilateral resistance training, bilateral overhead activities); 12+ weeks: FULL BILATERAL LOADING (bilateral push-ups, bilateral overhead press, return to full resistance training). MONITORING: sternal 'click' = sternal instability → REFER BACK TO SURGEON; wound dehiscence = surgical emergency.

EXERCISE SCIENCE

268. 'Rating of perceived exertion' (RPE) validity is HIGHEST when:

A. The patient is distracted

B. The patient is EXPERIENCED WITH THE SCALE (trained how to use it), the task is familiar, the patient is focused on their exertion level, and there are NO MODIFYING FACTORS (no beta-blockers, anxiety, or heat that would distort the relationship between RPE and actual physiological strain)

C. Music is playing

D. The patient is new to exercise

✓ Answer: B

💡 **Rationale & Explanation:**

RPE validity conditions: OPTIMAL RPE VALIDITY: 1) TRAINING: patient understands the scale and has practiced using it; 2) FAMILIAR TASK: experienced with the specific exercise modality; 3) FOCUSED ATTENTION: patient is attending to their exertion, not distracted; 4) NO MAJOR MODIFYING FACTORS: no beta-blockers (blunt HR → distort HR-RPE relationship); no extreme anxiety; no major heat exposure (increases RPE). FACTORS REDUCING VALIDITY: music (lowers RPE for same physiological load — a deliberate strategy to allow higher intensity exercise); distraction; first use without explanation; conditions causing cardiovascular drift (dehydration, heat) where HR is elevated beyond the actual effort. PRACTICAL: always explain and practice the RPE scale before using it for exercise prescription; reassess understanding if RPE seems inconsistent with physiological measures.

├— PHYSICAL AGENTS

269. 'US transducer ERA' (Effective Radiating Area) and its clinical importance:

A. ERA is the transducer face area

B. The ERA is the area of the transducer THAT ACTUALLY EMITS THERAPEUTIC ENERGY — a smaller ERA means the energy is concentrated in a smaller area; ERA is used to calculate the SPATIAL

AVERAGE INTENSITY (Watts/ERA cm²); the treatment area should be no larger than 2× the ERA for effective coverage

C. ERA is always equal to the transducer face

D. ERA has no clinical relevance

✓ **Answer: B**

💡 **Rationale & Explanation:**

ERA clinical use: ERA (effective radiating area): the portion of the transducer face that actually emits therapeutic US energy (not all of the face emits uniformly). SPATIAL AVERAGE INTENSITY (SAI) = Total Power (W) / ERA (cm²). This is the ACTUAL INTENSITY being delivered to the tissue. TREATMENT AREA: should be no larger than 2× the ERA to ensure adequate energy delivery. If you need to treat a larger area: move the transducer slowly in overlapping circles covering 2× ERA per stroke. BNR (BEAM NONUNIFORMITY RATIO): the ratio of peak to average intensity within the beam — BNR ≥6:1 means there are 'hot spots' in the beam with 6× the average intensity → more burn risk; higher quality transducers have lower BNR (≤4:1 is better).

├─ CARDIOPULMONARY PT

270. The 'CHEST PHYSIOTHERAPY' (manual) technique of 'percussion' (clapping) in secretion clearance:

A. Only loosens secretions superficially

B. Creates MECHANICAL VIBRATION through the chest wall that LOOSENS MUCUS from the airway walls — when combined with postural drainage positioning, gravity and loosened mucus move toward larger central airways for expectoration or suctioning

C. Directly suctions secretions

D. Provides pain relief only

✓ **Answer: B**

💡 **Rationale & Explanation:**

Manual chest PT (percussion/clapping): TECHNIQUE: cupped hands rhythmically strike the chest wall over the lung segment to be drained (patient positioned to drain that segment by gravity). MECHANISM: mechanical waves travel through the chest wall → DISLODGE MUCUS from the airway walls → loosened mucus drains by gravity toward larger airways where it can be expectorated or suctioned. COMBINED WITH POSTURAL DRAINAGE: percussion is most effective when the patient is positioned so the affected lobe is uppermost (gravity drainage). CONTRAINDICATIONS: over fractures, sites of recent surgery, metastases in ribs, thrombocytopenia, over subcutaneous emphysema. EVIDENCE: considered less effective than ACBT or OPEP devices for most patients (requires another person, uncomfortable, similar outcomes to self-administered techniques); still used in ICU and for very young children or severely neurologically impaired patients who cannot perform active airway clearance.

├─ EXERCISE SCIENCE

271. The 'dose-response relationship' for aerobic exercise and cardiovascular benefit: the MINIMUM effective dose for health benefits (not necessarily fitness improvement) is:

A. 30 min/day at 80% HRmax

B. 150 MINUTES PER WEEK of MODERATE-INTENSITY aerobic activity OR 75 minutes/week of VIGOROUS-INTENSITY — the WHO and ACSM guidelines based on extensive observational and intervention evidence showing mortality and cardiovascular disease risk reduction begins at this threshold

C. 10 min/week

D. 3 hours/day every day

✓ Answer: B

💡 **Rationale & Explanation:**

PA guidelines for health (not performance): WHO PHYSICAL ACTIVITY GUIDELINES (2020): MINIMUM: 150-300 min/week of MODERATE-

INTENSITY aerobic (e.g., brisk walking) OR 75-150 min/week of VIGOROUS-INTENSITY (running, fast cycling) OR EQUIVALENT COMBINATION. ADDITIONAL BENEFIT: up to 300 min moderate or 150 min vigorous per week provides further benefit. MUSCLE-STRENGTHENING: 2+ days/week (all major muscle groups). MINIMUM BOUT: even bouts <10 minutes count toward the weekly total (2020 guideline change — removed the 10-minute bout minimum from earlier guidelines). CLINICAL RELEVANCE: for sedentary patients, 150 min/week is the threshold where cardiovascular, metabolic, and psychological health benefits become substantial. Starting patients toward this goal is a PT public health responsibility.

⊢ PHYSICAL AGENTS

272. 'Laser therapy for wound healing' — optimal parameters for CHRONIC WOUNDS use:

A. 650nm, 10 J/cm²

B. 660-670nm (red) at 0.5-4 J/cm² — this wavelength is absorbed by cytochrome c oxidase in mitochondria of fibroblasts and endothelial cells → increases ATP production → stimulates collagen synthesis, angiogenesis, and cell migration; non-thermal photobiomodulation at this dose range

C. 1000nm, 20 J/cm²

D. Blue light only

✓ Answer: B

💡 **Rationale & Explanation:**

LLLT for chronic wounds: OPTIMAL WAVELENGTH: 660-670nm (red) — absorbed by chromophores in the epidermis and superficial dermis; directly stimulates fibroblasts and endothelial cells. ENERGY DENSITY: 0.5-4 J/cm² for chronic wound healing. MECHANISM: CYTOCHROME C OXIDASE STIMULATION → ↑ ATP production → stimulates: fibroblast proliferation and migration; collagen synthesis; angiogenesis (new capillary formation); reduce chronic inflammation. PROTOCOL: apply

to the wound edges and perilesional tissue; 3-5 sessions/week; continue until wound shows progressive healing. AVOID applying DIRECTLY to infected tissue without addressing the infection first. EVIDENCE: moderate for pressure ulcers, venous leg ulcers, diabetic foot ulcers — as part of comprehensive wound care.

├— CARDIOPULMONARY PT

273. In 'acute ICU physical therapy', the EVIDENCE-BASED primary goal of early mobilization is:

A. Only maintaining ROM

B. PREVENTING ICU-ACQUIRED WEAKNESS (ICUAW) — a syndrome of diffuse muscle weakness (including respiratory muscles) caused by immobility, mechanical ventilation, and critical illness; early progressive mobilization (passive ROM → active assisted → active → sitting → standing → walking) preserves muscle mass, reduces delirium duration, reduces ICU LOS, and improves long-term functional outcomes

C. Only psychological benefit

D. Only preventing DVT

✓ Answer: B

💡 **Rationale & Explanation:**

Early ICU mobilization evidence: ICU-ACQUIRED WEAKNESS (ICUAW): occurs in 25-50% of mechanically ventilated patients; profound generalized weakness (MRC Sumscore <48/60); affects ventilator weaning, functional recovery, and quality of life for months to years. EARLY PROGRESSIVE MOBILIZATION PROTOCOL: Level 1 (sedated): passive ROM; Level 2 (awakening): active-assisted exercises in bed; Level 3 (cooperative): sitting at edge of bed; Level 4 (stable): standing with support; Level 5 (improving): walking with assistance. EVIDENCE: Level 1 (Cochrane review 2018): early mobilization reduces ICU LOS, hospital LOS, delirium duration, and improves physical function at discharge and long-term. SAFETY: with appropriate screening

(hemodynamic stability, adequate oxygenation, no active procedures) — early mobilization of mechanically ventilated patients is SAFE in most cases.

├─ EXERCISE SCIENCE

274. 'EPOC training' — which type of exercise produces the LARGEST and LONGEST-LASTING EPOC?

A. Moderate continuous cardio

B. HIGH-INTENSITY INTERVAL TRAINING (HIIT) — the intense anaerobic intervals create a large oxygen debt and metabolic disruption that requires prolonged recovery; HIIT-induced EPOC can persist for 12-24+ hours vs. 1-3 hours for moderate continuous exercise

C. Yoga

D. Flexibility training only

✓ Answer: B

💡 **Rationale & Explanation:**

HIIT and EPOC: EPOC MAGNITUDE AND DURATION: Low intensity (40% VO2max, 30 min): EPOC = 5-10% of exercise caloric expenditure, lasting 1-3 hours. MODERATE INTENSITY (60% VO2max, 30 min): EPOC = 8-15% of exercise energy, 2-5 hours. HIIT (90%+ VO2max, 20 min): EPOC = 10-20% of exercise energy, 12-24+ hours. MECHANISMS OF LARGE HIIT EPOC: phosphocreatine restoration (fast component); lactate clearance and glucose resynthesis; hormonal elevation (GH, cortisol, epinephrine remain elevated longer); protein turnover (muscle repair from DOMS); thermoregulatory adjustments persist longer. CLINICAL: HIIT produces comparable or greater metabolic benefits to MICT at shorter total exercise time — the EPOC component partly explains this efficiency advantage. For weight management programs, HIIT creates an extended 'caloric afterburn' that MICT does not produce as substantially.

⊢ PHYSICAL AGENTS

275. 'Iontophoresis for plantar fasciitis' — the MOST EVIDENCE-BASED drug-current combination uses:

A. Positive electrode with hydrocortisone

B. NEGATIVE ELECTRODE with DEXAMETHASONE SODIUM PHOSPHATE (water-soluble steroid) — the negatively charged dexamethasone is repelled from the negative electrode toward the plantar fascia; multiple RCTs show significant pain reduction and improved function vs. sham iontophoresis

C. Positive electrode with calcium

D. Negative electrode with calcium

✓ Answer: B

💡 **Rationale & Explanation:**

Dexamethasone iontophoresis for plantar fasciitis: PRINCIPLE: like charges repel → negative electrode repels the negatively charged dexamethasone ion (dexamethasone sodium PHOSPHATE) TOWARD the tissue. DRUG: dexamethasone sodium phosphate 4 mg/mL (water-soluble form required — not standard dexamethasone which is poorly water-soluble). PARAMETERS: negative active electrode over the plantar fascia insertion; 0.4 mA/cm² (below 0.5 mA/cm² safety limit); 40 mA-min total dose; 10-15 min session; typically 6-8 sessions over 3-4 weeks. EVIDENCE: Level 2 (multiple RCTs) showing significant pain reduction in plantar fasciitis, superior to sham iontophoresis and comparable to corticosteroid injection for short-term pain relief. ADVANTAGE over injection: no needle; no local tissue atrophy risk; multiple treatments possible.

⊢ CARDIOPULMONARY PT

276. 'Inspiratory muscle weakness' threshold for targeting IMT in COPD:

A. Any FEV1 reduction

B. MIP (MAXIMAL INSPIRATORY PRESSURE) <60% predicted — patients with inspiratory muscle weakness below this threshold gain the greatest benefit from dedicated inspiratory muscle training (IMT); those with normal inspiratory muscle strength may not benefit significantly from IMT but still benefit from general exercise training

C. FVC <80% predicted

D. SpO2 <95%

✓ Answer: B

💡 **Rationale & Explanation:**

IMT patient selection: MIP THRESHOLD: <60% of age/sex-predicted normal MIP = INSPIRATORY MUSCLE WEAKNESS → IMT is specifically indicated as an ADDITIONAL intervention beyond general exercise training. In patients with MIP >60% predicted: IMT may provide small additional benefit but is not clearly superior to general aerobic training alone. TESTING MIP: patient inhales maximally from residual volume, then exhales as forcefully as possible against a closed valve; the maximum pressure generated = MIP. EQUIPMENT: manometer or electronic respiratory muscle testing device. PHILIPPINE CLINICAL CONTEXT: MIP testing requires specific respiratory testing equipment — available in tertiary hospital respiratory laboratories and some specialized pulmonary rehabilitation centers. In settings without MIP testing: clinical signs of inspiratory muscle weakness (paradoxical breathing, accessory muscle use at rest, Hoover's sign) guide clinical judgment.

⊢ EXERCISE SCIENCE

277. 'Core stability' vs. 'Core strength': clinically, CORE STABILITY is more specifically about:

A. Maximum abdominal contraction force

B. The ABILITY TO MAINTAIN SPINAL NEUTRAL UNDER LOAD — the deep stabilizers (TrA, multifidus, pelvic floor, diaphragm) provide anticipatory, continuous, co-contraction that maintains vertebral alignment during limb movements; this is different from core STRENGTH (the maximum force the trunk muscles can generate)

C. Only lumbar rotation

D. Bracing the abdomen maximally

✓ Answer: B

💡 **Rationale & Explanation:**

Core stability vs. core strength: CORE STRENGTH: maximum force production of the trunk muscles (e.g., 1RM deadlift, maximum plank time). CORE STABILITY: the NEUROMUSCULAR CONTROL of the trunk that maintains vertebral alignment BEFORE AND DURING movement — particularly the: ANTICIPATORY (feedforward) activation of TrA and multifidus that precedes limb movement; CO-CONTRACTION of deep and superficial muscles to create 'cylinder' stability; TIMING and COORDINATION of deep muscle activation relative to superficial muscles. CLINICAL RELEVANCE: patients with chronic LBP have impaired TIMING of TrA activation (delayed, not absent) — they may have adequate core STRENGTH but poor core STABILITY (control). Treatment targets the CONTROL, not just the strength. McGill's 'Big 3' exercises (curl-up, side plank, bird-dog) target stability over maximal strength.

├— PHYSICAL AGENTS

278. 'Electrotherapy electrode size' affects treatment because:

A. Larger electrodes are always better

B. ELECTRODE SIZE AFFECTS CURRENT DENSITY — with the same current, a SMALLER ELECTRODE concentrates the current over a smaller area (HIGHER CURRENT DENSITY = more intense stimulation); a LARGER ELECTRODE spreads the current over a greater area (LOWER

CURRENT DENSITY = more comfortable, less intense); the ACTIVE (smaller) electrode is placed over the target site

C. All sizes deliver the same dose

D. Only the positive electrode size matters

✓ Answer: B

💡 **Rationale & Explanation:**

Electrode size and current density: CURRENT DENSITY = Current (mA) / Electrode area (cm^2). Example: 10 mA through a 4 cm^2 electrode = 2.5 mA/cm^2. Same 10 mA through a 2 cm^2 electrode = 5 mA/cm^2 (twice as concentrated). CLINICAL USE: ACTIVE ELECTRODE: smaller → higher current density → more focused, more intense stimulation at the target site; DISPERSIVE (return) ELECTRODE: larger → lower current density → comfortable return path without therapeutic effect at the dispersive site. In NMES for muscle strengthening: smaller active electrode over the motor point → optimal activation. In TENS for pain: moderately-sized electrodes over or around the painful area. SAFETY: ensure the dispersive electrode is always LARGER than the active electrode to prevent burns at the return electrode site.

├— CARDIOPULMONARY PT

279. 'Orthostatic hypotension' in cardiac patients — the PT management during exercise includes:

A. Ignore it and continue

B. GRADUAL POSITION CHANGES (allow 30-60 seconds at each level: supine → sitting → standing); compression stockings; abdominal binder when indicated; ensuring adequate hydration; avoiding sudden movements; monitoring BP with position change; if SBP drops >20 mmHg or patient is symptomatic, return to a lower position

C. Aggressive upright positioning

D. Increasing exercise intensity

✓ Answer: B

💡 **Rationale & Explanation:**

Orthostatic hypotension in PT: DEFINITION: SBP drop ≥20 mmHg or DBP drop ≥10 mmHg within 3 minutes of standing. COMMON IN: cardiac patients, elderly, patients on antihypertensives, SCI above T6, prolonged bed rest, dehydration. PT MANAGEMENT: 1) GRADUAL POSITION TRANSITIONS: supine → 30° elevation → 60° → sitting → standing (30-60 seconds at each level); 2) COMPRESSION STOCKINGS: reduces venous pooling in legs; 3) ABDOMINAL BINDER (especially for SCI): reduces venous pooling in abdomen; 4) HYDRATION: adequate fluid intake before PT sessions; 5) TIMING: schedule PT 1-2 hours after meals (postprandial hypotension risk); after medications have peaked. If symptomatic (dizziness, near-syncope, pallor) → immediately return to lying position; elevate legs; monitor until BP stabilizes.

├─ EXERCISE SCIENCE

280. 'Training for endurance vs. power' in the SAME MUSCLE GROUP: training both simultaneously is called:

A. Single-system training

B. COMPLEX TRAINING — alternating heavy resistance exercises (to activate high-threshold motor units and produce post-activation potentiation/PAP) with PLYOMETRIC exercises targeting the SAME MUSCLE GROUP within the same session; PAP temporarily enhances neuromuscular function, allowing greater plyometric performance immediately after the heavy set

C. Concurrent training

D. Circuit training only

✓ **Answer: B**

💡 **Rationale & Explanation:**

Complex training (PAP-based): DEFINITION: alternating heavy resistance exercise (85%+ 1RM) with a biomechanically similar plyometric exercise in the same session. Example: 3×5 back squats at

85% 1RM + 3×5 squat jumps (with 3-5 min rest between the pair). POST-ACTIVATION POTENTIATION (PAP): heavy resistance loading temporarily increases the myosin light chain phosphorylation → motor neuron excitability is heightened for 4-12 minutes → the PLYOMETRIC exercise performed in this window benefits from enhanced neuromuscular function → greater power output. COMPARISON TO CONCURRENT TRAINING: concurrent training = two separate training types in the same session (aerobic + resistance) → interference effect possible. COMPLEX TRAINING = resistance followed by similar plyometric → NO interference; SYNERGISTIC effect (PAP enhances plyometric output). Used for advanced athletic training and return-to-sport programs.

├— PHYSICAL AGENTS

281. 'Electrical stimulation for spasticity management' — the most evidence-based application uses:

A. TENS at low frequency

B. NMES/FES targeting ANTAGONIST MUSCLES of the spastic muscles — electrical stimulation of the ANTAGONIST (e.g., dorsiflexors for calf spasticity) activates the reciprocal inhibitory pathways, temporarily REDUCING TONE in the spastic agonist (gastrocnemius/soleus); 20-30 minutes of stimulation can produce tone reduction lasting 1-6 hours post-stimulation

C. Continuous TENS at maximum intensity

D. HVPC over the spastic muscle directly

✓ Answer: B

💡 Rationale & Explanation:

Electrical stimulation for spasticity: ANTAGONIST STIMULATION MECHANISM: NMES activates the ANTAGONIST muscle → Ia reciprocal inhibition of the spastic AGONIST motor neurons → temporary TONE REDUCTION in the agonist. EXAMPLE: for CALF SPASTICITY in stroke: NMES to the TIBIALIS ANTERIOR → activates dorsiflexors → inhibits the

hypertonic gastrocnemius → temporary tone reduction → improved ROM and gait quality. DURATION: 20-30 min sessions; tone reduction can persist 1-6+ hours post-stimulation (mechanisms include: normalization of interneuron circuits; fatigue of the spastic motor neurons; gate control). COMBINED WITH STRETCHING: stimulate the antagonist first → use the window of reduced tone for stretching → enhanced ROM gains. EVIDENCE: Level 2 for stroke spasticity; used as adjunct to other spasticity management (positioning, splinting, botox, baclofen).

├— CARDIOPULMONARY PT

282. The 'BODE index' in COPD predicts:

A. Only dyspnea

B. MORTALITY and DISEASE SEVERITY — a composite of: B = BMI (body mass index), O = airflow Obstruction (FEV1% predicted), D = Dyspnea (mMRC scale), E = Exercise capacity (6MWT); scores 0-10; higher BODE score = higher mortality risk; better predictor of survival than FEV1 alone

C. Only FEV1

D. Only exercise capacity

✓ Answer: B

💡 **Rationale & Explanation:**

BODE Index: B = BMI: >21 = 0 points; ≤21 = 1 point (low BMI = worse). O = FEV1% predicted: ≥65% = 0; 50-64% = 1; 36-49% = 2; ≤35% = 3. D = mMRC dyspnea: 0-1 = 0; 2 = 1; 3 = 2; 4 = 3. E = 6MWT: ≥350m = 0; 250-349m = 1; 150-249m = 2; ≤149m = 3. TOTAL: 0-10. MORTALITY PREDICTION: BODE 0-2 = 15% 4-year mortality; BODE 5-6 = 60%; BODE 7-10 = 80%. PULMONARY REHABILITATION BENEFIT: BODE score improves with PR (primarily through 6MWT improvement + dyspnea reduction + weight gain in malnourished patients) → translates to mortality reduction benefit. The BODE index demonstrates that

exercise capacity (6MWT) and dyspnea are as important as lung function (FEV1) for COPD prognosis.

├─ EXERCISE SCIENCE

283. 'Stretch-shortening cycle' (SSC) is fundamental to which PT intervention?

A. Static stretching programs

B. PLYOMETRIC TRAINING — plyometrics exploit the SSC (eccentric loading → brief amortization → explosive concentric contraction) to develop neuromuscular power; the SSC also underlies normal gait and most athletic movements

C. Passive ROM exercises

D. Manual traction

✓ Answer: B

💡 **Rationale & Explanation:**

SSC in plyometric training: STRETCH-SHORTENING CYCLE: ECCENTRIC PHASE: muscle-tendon unit is rapidly loaded and lengthened (landing → storing elastic energy in tendons + activating stretch reflex); AMORTIZATION PHASE: brief transition (shorter = more efficient SSC); CONCENTRIC PHASE: rapid muscle shortening releasing stored elastic energy PLUS active muscle contraction → total power greater than concentric alone. WHY SSC MATTERS: running involves SSC with every stride; jumping, cutting, changing direction = SSC movements; sports injuries often occur during the SSC (ACL tears during eccentric-to-concentric transition). TRAINING GOAL: optimize SSC efficiency → reactive strength index (RSH = jump height / ground contact time) improves with plyometric training. REHABILITATION: plyometric progression systematically reintroduces SSC loading, starting with low-intensity bilateral SSC (bilateral jump landing) and progressing to high-intensity unilateral SSC (single-leg reactive hops).

⊢ PHYSICAL AGENTS

284. 'Whirlpool CONTRAINDICATIONS': applying whirlpool to a patient with a VENOUS STASIS ULCER is:

A. Always safe

B. CONDITIONALLY SAFE — if the wound is infected and requires DEBRIDEMENT: whirlpool may be used briefly (10-15 min) at tepid temperature; however, prolonged whirlpool soaking of venous ulcers is CONTRAINDICATED because the DEPENDENT POSITIONING in the whirlpool increases venous hypertension in an already compromised venous system — worsening the underlying cause of the ulcer; NEGATIVE PRESSURE WOUND THERAPY or non-immersive wound irrigation is preferred

C. Always contraindicated

D. Beneficial for all venous ulcers

✓ Answer: B

💡 **Rationale & Explanation:**

Whirlpool and venous stasis ulcers: VENOUS ULCER PATHOPHYSIOLOGY: caused by VENOUS HYPERTENSION (incompetent venous valves → blood pools in lower extremity veins → elevated capillary pressure → tissue breakdown). WHIRLPOOL PROBLEM: patient must place the leg BELOW heart level in the whirlpool → INCREASES venous pressure → WORSENS the underlying pathophysiology → potentially enlarges the ulcer. WHEN WHIRLPOOL MIGHT BE USED (short-term only): for débridement of necrotic or infected tissue that cannot be managed by other means; limited duration (10-15 min); tepid water. PREFERRED ALTERNATIVES: non-immersive wound irrigation (pulsatile lavage), compression therapy, NPWT (negative pressure wound therapy), moist wound care dressings. COMPRESSION is the cornerstone of venous ulcer management — ELEVATION and COMPRESSION are more appropriate than whirlpool.

CARDIOPULMONARY PT

285. 'Cardiac rehabilitation TELEMETRY monitoring' indications: patients who MUST have continuous ECG during exercise include:

A. All cardiac rehab patients always

B. Patients with KNOWN ARRHYTHMIAS, RECENT MI (<3 months) or UNSTABLE ANGINA history, PACEMAKER-DEPENDENT patients, LOW EJECTION FRACTION (<30%), and SYMPTOMS OF PALPITATIONS OR SYNCOPE during exercise — these high-risk groups need telemetry to detect arrhythmias safely during exercise

C. Only pacemaker patients

D. Only elderly patients

✓ Answer: B

💡 Rationale & Explanation:

Cardiac rehab telemetry indications: HIGH-RISK (require continuous ECG): 1) Known significant arrhythmias (VT, AF with rapid ventricular response, frequent PVCs); 2) Recent MI or unstable angina (<3 months); 3) Pacemaker-dependent patients; 4) EF <30% (severe LV dysfunction); 5) Symptoms of palpitations or syncope during exercise; 6) Complex congenital heart disease. MODERATE RISK (may require telemetry initially, can transition to non-telemetry): post-CABG or valve surgery; known silent ischemia; mild-moderate LV dysfunction. LOW RISK (can exercise without continuous telemetry after initial assessment): stable well-controlled CAD, normal LV function, no arrhythmias, uncomplicated CABG or MI. Telemetry allows detection of exercise-induced arrhythmias that would otherwise be missed and potentially cause catastrophic events during exercise.

EXERCISE SCIENCE

286. The '6-item Likert scale for exercise motivation' is an example of which measurement level?

A. Ratio

B. ORDINAL — the categories have a meaningful order (strongly disagree → strongly agree) but the INTERVALS BETWEEN CATEGORIES ARE NOT NECESSARILY EQUAL; cannot assume the difference between categories 1-2 is the same as between categories 4-5

C. Nominal

D. Interval

✓ Answer: B

💡 **Rationale & Explanation:**

Ordinal measurement in PT: NOMINAL: categories with no order (e.g., diagnostic categories — fracture, sprain, strain); no mathematical operations meaningful. ORDINAL: categories with meaningful ORDER but unequal intervals (e.g., Likert scales, MMT grades, modified Ashworth scale, Functional Independence Measure levels); can rank-order, but CANNOT compute meaningful means (though means are commonly — incorrectly — reported); appropriate statistics: medians, modes, non-parametric tests. INTERVAL: ordered with equal intervals but no true zero (e.g., Celsius temperature, calendar years). RATIO: ordered, equal intervals, TRUE ZERO (e.g., ROM in degrees, weight, distance, time). CLINICAL IMPLICATION: for ordinal PT outcome data (Likert, MAS, MMT), non-parametric statistics (Wilcoxon signed-rank, Mann-Whitney U) are theoretically more appropriate than t-tests; however, parametric tests are commonly used in PT research when ordinal scales have multiple categories (debated in the literature).

├— PHYSICAL AGENTS

287. 'Cold laser therapy' vs. 'hot laser therapy' (surgical laser): the fundamental difference is:

A. Wavelength only

B. POWER — therapeutic LLLT uses powers of 1-500 mW (milliwatts — thousandths of a watt); surgical lasers use watts to KILOWATTS of

power that burn, cut, or ablate tissue; LLLT is TOO WEAK to cause thermal damage and works through PHOTOBIOMODULATION (non-thermal mechanisms)

C. Color of the light

D. Application technique

✓ Answer: B

💡 **Rationale & Explanation:**

LLLT vs. surgical laser: POWER COMPARISON: LLLT (Low Level Laser Therapy/PBMT): 1-500 mW → power density 5-50 mW/cm² → photobiomodulation (non-thermal). SURGICAL LASER (Nd:YAG, CO2, diode): 1-50+ WATTS → power density 1000+ W/cm² → THERMAL ABLATION, cutting, coagulation. WHY LLLT DOESN'T BURN: the power is too low to raise tissue temperature significantly (therapeutic LLLT raises tissue temperature <0.1°C); instead it works through PHOTON ABSORPTION by chromophores (primarily cytochrome c oxidase) → triggers cell signaling cascades → photobiological effects. PATIENT EDUCATION: explaining this difference reduces patient anxiety ('laser' sounds scary); LLLT is 'soft laser' — no heat, no pain, no burning, no tissue damage at therapeutic doses.

├─ CARDIOPULMONARY PT

288. 'Breathing pattern' assessment in COPD: the 'Hoover's sign' indicates:

A. Normal diaphragm function

B. SEVERE DIAPHRAGM FLATTENING from hyperinflation — during inspiration, the flat diaphragm pulls the lower ribs INWARD (paradoxical inward movement of the lower rib cage) instead of outward; this is a sign of advanced hyperinflation and poor inspiratory mechanics

C. Normal breathing

D. Only in pediatric patients

✓ **Answer: B**

💡 **Rationale & Explanation:**

Hoover's sign: MECHANISM: in normal breathing, the diaphragm domes downward and outward → the lower rib cage expands outward during inspiration. In SEVERE COPD HYPERINFLATION: the diaphragm is flattened (pushed down by trapped air) → upon contraction it SHORTENS HORIZONTALLY (its fibers are horizontal, not vertical) → the shortened diaphragm PULLS THE LOWER RIBS INWARD during inspiration → PARADOXICAL LOWER CHEST MOVEMENT (inward not outward). CLINICAL SIGNIFICANCE: Hoover's sign indicates: severe hyperinflation; poor diaphragmatic function; likely severe COPD; poor respiratory mechanics; may predict worse exercise tolerance and prognosis. PT IMPLICATION: diaphragmatic breathing training has limited effect when the diaphragm is severely flattened — pursed-lip breathing, accessory muscle use management, and upper chest breathing pattern management become more important.

├─ EXERCISE SCIENCE

289. 'Peripheral fatigue' vs. 'central fatigue' in exercise science: the PT must understand:

A. They are the same

B. PERIPHERAL fatigue occurs AT THE MUSCLE (failure of cross-bridge cycling, metabolite accumulation, impaired Ca^{2}+ release) and responds to LOCAL INTERVENTIONS (massage, ice, rest); CENTRAL FATIGUE occurs IN THE BRAIN AND SPINAL CORD (reduced neural drive to muscles despite the muscle still having capacity) and is more influenced by MOTIVATION, MOOD, SEROTONIN, and SLEEP

C. Only peripheral fatigue is real

D. Central fatigue cannot be treated

✓ **Answer: B**

💡 **Rationale & Explanation:**

Peripheral vs. central fatigue: PERIPHERAL FATIGUE: 1) METABOLITE ACCUMULATION: lactate, H+, Pi (inorganic phosphate) → inhibit contractile proteins; 2) GLYCOGEN DEPLETION: fuel exhaustion; 3) IMPAIRED CA^{2}+ RELEASE from SR (excitation-contraction coupling failure). RESPONDS TO: local muscle rest, cooling, massage, nutrition (glycogen replenishment), adequate recovery. CENTRAL FATIGUE: reduced VOLUNTARY NEURAL DRIVE to muscles from supraspinal (brain) and spinal cord circuits; NOT caused by muscle failure — the muscle can still contract if stimulated electrically. INFLUENCED BY: sleep deprivation (worsens central fatigue dramatically); mood disorders (depression greatly amplifies central fatigue); motivation; serotonin:dopamine balance. CLINICAL RELEVANCE: CFS/ME = predominantly CENTRAL fatigue (explains why peripheral muscle testing may be normal); MS fatigue = central + peripheral component; cancer-related fatigue = complex central + peripheral + psychological factors.

├— PHYSICAL AGENTS

290. 'Pulsatile lavage with suction' (PLWS) for wound care — the PT role:

A. PTs never perform wound care

B. PLWS is within PT scope in wound care specialization — the technique uses PRESSURIZED IRRIGATION (delivering irrigant to the wound via a pulsatile handpiece at controlled pressures: 4-15 psi) COMBINED WITH SIMULTANEOUS SUCTION to remove debris, bacteria, and exudate; produces superior débridement to whirlpool without the immersion/dependent positioning problems

C. Only physicians perform PLWS

D. Only nurses perform PLWS

✓ Answer: B

💡 Rationale & Explanation:

PLWS in wound care PT: MECHANISM: pulsatile pressurized saline irrigation disrupts biofilm and removes necrotic tissue, bacteria, and

exudate from the wound; simultaneous suction removes the irrigation fluid and débridement products. ADVANTAGES OVER WHIRLPOOL: 1) No dependent positioning (the wound can be treated in any position — patient can remain supine); 2) Focused treatment (only the wound is treated, not the entire limb); 3) Adjustable pressure (4-15 psi; higher for thick eschar, lower for fragile granulation tissue); 4) No cross-contamination risk between patients. PRESSURE GUIDELINES: clean granulation tissue: 4-8 psi; necrotic tissue/eschar: 8-15 psi; never >15 psi (damages granulation tissue). PT TRAINING: wound care specialization with PLWS training; protective equipment required (gown, gloves, mask, eye shield — aerosolization risk).

├— CARDIOPULMONARY PT

291. 'Venous thromboembolism' (VTE) prevention in hospitalized patients: PT role:

A. PT is not involved in VTE prevention

B. EARLY PROGRESSIVE MOBILIZATION is the most important PT contribution — early ambulation activates the calf muscle pump, preventing venous stasis in the deep veins of the lower extremities; PT also teaches ANKLE PUMPS and LEG EXERCISES for patients who cannot ambulate, and identifies RED FLAGS (unilateral calf pain, swelling, erythema) that may indicate DVT requiring medical investigation

C. Only prescribing medications

D. Only applying compression stockings

✓ Answer: B

💡 **Rationale & Explanation:**

PT and VTE prevention: CALF MUSCLE PUMP: contraction of the gastrocnemius and soleus during walking COMPRESSES the deep veins of the calf → pumps blood proximally → prevents venous stasis → reduces DVT risk. PT ROLE: 1) EARLY MOBILIZATION (most important): ambulate patients as early as clinically safe post-operatively or post-

medical admission; 2) EXERCISE IN BED: ankle pumps (10-15 reps/hour while awake), heel slides, knee bends → activates the calf muscle pump in immobile patients; 3) DVT SURVEILLANCE: check for unilateral calf tenderness, swelling, warmth, erythema at every PT session → report suspicious findings immediately; 4) COMPRESSION DEVICES: ensure graduated compression stockings and intermittent pneumatic compression devices are applied correctly and being used. VTE is a preventable MAJOR COMPLICATION of hospitalization — PT mobilization is a key non-pharmacological prevention strategy.

├─ EXERCISE SCIENCE

292. 'Progressive muscle relaxation' (PMR) in rehabilitation is used for:

A. Building muscle strength

B. REDUCING TENSION AND ANXIETY by systematically TENSING and RELAXING MUSCLE GROUPS — the contrast between tension and relaxation helps patients perceive and voluntarily reduce muscle tension; used for chronic pain, anxiety, stress-related musculoskeletal conditions, and pre-exercise relaxation

C. Cardiovascular training

D. Only post-surgical patients

✓ Answer: B

💡 **Rationale & Explanation:**

PMR (Jacobson, 1929): patient systematically tenses specific muscle groups for 5-10 seconds, then RELEASES and notices the relaxation for 20-30 seconds. SEQUENCE: typically progresses from distal to proximal (feet → calves → thighs → abdomen → hands → arms → shoulders → neck → face). PHYSIOLOGICAL EFFECTS: activates the parasympathetic nervous system; reduces cortisol; lowers HR and BP; reduces muscle EMG activity below baseline level. CLINICAL APPLICATIONS: CHRONIC LBP (muscle tension component); TENSION HEADACHES; FIBROMYALGIA; TEMPOROMANDIBULAR DISORDERS; pre-sleep relaxation for patients with sleep-disturbed chronic pain; ANXIETY

ASSOCIATED WITH REHABILITATION (fear of movement, kinesiophobia). COMBINED WITH: pain neuroscience education; diaphragmatic breathing; mindfulness-based stress reduction. Takes 15-20 minutes to complete a full session; can be abbreviated (5-7 muscle groups) as patients become proficient.

├─ PHYSICAL AGENTS

293. 'Acoustic streaming' in ultrasound therapy is the:

A. Heating of tissue directly

B. The DIRECTIONAL MOVEMENT OF FLUID along the US beam axis — caused by the pressure differential generated by US waves; this movement transports nutrients, removes waste products, and may alter cell membrane permeability; it is a PRIMARY NON-THERMAL MECHANISM of pulsed ultrasound at therapeutic intensities

C. Cavitation of gas bubbles only

D. The reflection of sound from bone

✓ Answer: B

💡 Rationale & Explanation:

Acoustic streaming: the pressure variations of the US wave create a DIRECTIONAL FLUID FLOW along the beam axis. EFFECTS: 1) MASS TRANSPORT: enhanced movement of nutrients, ions, and waste products across cell membranes and through interstitial fluid; 2) MEMBRANE PERMEABILITY: altered ion channel activity; increased cellular uptake of nutrients; 3) CELLULAR STIMULATION: enhanced fibroblast activity, collagen synthesis, macrophage activation; 4) EDEMA REDUCTION: fluid movement toward lymphatic drainage channels. CLINICAL RELEVANCE: explains why PULSED US (minimal thermal effect) can still produce therapeutic biological effects — acoustic streaming and stable cavitation are the primary mechanisms. Used in: wound healing (pulsed US at low intensities), edema management, tendon healing. The non-thermal mechanisms allow

pulsed US to be applied in situations where tissue heating would be contraindicated.

├— CARDIOPULMONARY PT

294. In the management of a patient post-TOTAL KNEE ARTHROPLASTY (TKA) with KNOWN COPD, the PT must prioritize:

A. Only knee rehabilitation

B. RESPIRATORY MONITORING ALONGSIDE KNEE REHABILITATION — post-general anesthesia + immobility + opioid analgesia + COPD = HIGH RISK FOR POST-OPERATIVE PULMONARY COMPLICATIONS; incentive spirometry, deep breathing exercises, early mobilization, and monitoring for respiratory deterioration are as critical as knee ROM and strengthening

C. Only cardiopulmonary PT

D. Only pain management

✓ Answer: B

💡 **Rationale & Explanation:**

Post-TKA rehabilitation in COPD: RESPIRATORY RISKS post-TKA with COPD: 1) GENERAL ANESTHESIA effects (residual secretion clearance impairment); 2) PAIN with deep breathing (splinting → atelectasis); 3) OPIOID ANALGESIA (respiratory depression, reduced cough reflex → secretion accumulation); 4) IMMOBILITY (reduced lung volumes, increased DVT risk); 5) COPD BASELINE (already reduced respiratory reserve). PT INTEGRATED APPROACH: hourly IS (incentive spirometry); diaphragmatic breathing exercises; ACBT (if secretions present); EARLY AMBULATION (as soon as hemodynamically stable); monitor SpO2 and RR at all times; ensure supplemental O2 is available; teach controlled coughing for secretion clearance; balance pain management and alertness for effective breathing exercises. OUTCOME: preventing post-operative pneumonia and respiratory failure is as important as achieving knee ROM targets.

EXERCISE SCIENCE

295. 'Rate of force development' (RFD) is particularly relevant to which patient population?

A. Competitive swimmers only

B. ELDERLY PATIENTS AND FALL PREVENTION — falls typically occur when the balance perturbation is too fast for the patient to recover; the SPEED of generating protective stepping force (RFD) declines more rapidly with aging than maximum strength, and is a stronger predictor of fall recovery success than maximum strength alone

C. Only power athletes

D. Only acute injury patients

✓ Answer: B

💡 Rationale & Explanation:

RFD and elderly falls: RFD (Rate of Force Development): how QUICKLY force is generated in the first 0-200 ms of a contraction — the relevant timeframe for reactive stepping (the window available to prevent a fall). AGE-RELATED CHANGES: maximum strength declines ~1-2% per year after age 65; RFD declines ~3-4% per year (faster decline). FALL MECHANISM: a stumble gives approximately 100-200 ms for a protective step to be generated; this requires HIGH RFD, not just high maximum strength — a strong but SLOW patient may not generate force fast enough to prevent the fall. TRAINING RFD: POWER TRAINING (30-60% 1RM, explosive intent); PERTURBATION TRAINING (reactive stepping); PLYOMETRICS (appropriate intensity for the individual); the focus is on SPEED OF FORCE PRODUCTION, not just maximum force. Evidence: RFD-focused training reduces falls in elderly by improving the speed and effectiveness of protective stepping responses.

PHYSICAL AGENTS

296. 'Hydrotherapy temperature zones' for different therapeutic goals: COLD WATER (15-18°C) is used for:

A. Warming deep tissues

B. COOLING and POST-EXERCISE RECOVERY — cold water immersion (CWI) reduces acute inflammation, muscle soreness (DOMS), core temperature after exercise in heat, and possibly some neural pain modulation; CONTRAST BATHS use alternating hot-cold to create 'vascular pumping' (vasodilation-vasoconstriction cycles)

C. General relaxation

D. Aerobic exercise conditioning

✓ Answer: B

💡 **Rationale & Explanation:**

Hydrotherapy temperature ranges: HOT (37-43°C): vasodilation, muscle relaxation, pain relief, increased extensibility. WARM (32-36°C): therapeutic exercise, neuromuscular facilitation, arthritic pain relief, aquatic therapy for neurological patients. NEUTRAL (34-36°C): lowest physiological strain; used for psychological relaxation, burn patients, sensitive MS patients (Uhthoff prevention). TEPID (26-33°C): moderate exercise; some COPD and cardiovascular patients. COOL (18-26°C): minor trophic stimulation. COLD (15-18°C): POST-EXERCISE RECOVERY, acute inflammation reduction, DOMS management, cold water immersion for athletes. ICE WATER (< 15°C): acute injury (5-10 min only — risk of frostbite); elite sport recovery (contrast baths). CONTRAST BATH PROTOCOL: 3-4 min HOT (40°C) → 1 min COLD (15°C); repeat 3-5 cycles; end with cold; promotes vascular pumping — used for subacute musculoskeletal conditions.

├— CARDIOPULMONARY PT

297. 'Exercise stress testing' stop criteria (ABSOLUTE) in addition to patient request include:

A. Mild fatigue

B. ST DEPRESSION >2 mm HORIZONTAL OR DOWNSLOPING (suggesting myocardial ischemia), SUSTAINED VT OR OTHER SERIOUS ARRHYTHMIA, FALL IN SBP >10 mmHg BELOW BASELINE WITH INCREASING WORKLOAD, SEVERE ANGINA, SIGNS OF POOR PERFUSION (cyanosis, pallor), TECHNICAL INABILITY TO MONITOR (loss of ECG contact)

C. Any ST change

D. RPE >12

✓ Answer: B

💡 **Rationale & Explanation:**

Absolute exercise testing stop criteria (ACSM): 1) PATIENT REQUEST to stop; 2) ST ELEVATION (>1 mm in non-Q leads) or DEPRESSION (>2 mm horizontal/downsloping = ischemia); 3) ANGINA (moderate to severe — Grade 3 on angina scale); 4) SUSTAINED VT or OTHER SERIOUS ARRHYTHMIA (complete heart block, AF with rapid ventricular response); 5) EXERTIONAL HYPOTENSION (SBP falls >10 mmHg below baseline despite increasing workload); 6) SEVERE HYPERTENSION (SBP >250 mmHg or DBP >115 mmHg); 7) SIGNS OF POOR PERFUSION (cyanosis, pallor, diaphoresis, lightheadedness, confusion); 8) TECHNICAL: inability to monitor ECG, patient becomes unable to maintain safe footing. RELATIVE STOP CRITERIA (consider stopping): non-sustained VT, ST depression 1-2 mm, increasing chest pain, extreme fatigue, marked dyspnea, symptomatic hypertension.

├— EXERCISE SCIENCE

298. 'High-intensity interval training' (HIIT) for cardiac rehabilitation: which statement is EVIDENCE-BASED?

A. HIIT is always contraindicated after cardiac events

B. HIIT (with appropriate screening, medical clearance, and supervision) produces SUPERIOR VO2MAX IMPROVEMENTS vs. MICT (moderate intensity continuous training) in STABLE cardiac patients with comparable safety — multiple RCTs including the SMARTEX-HF

trial and NordHeart trials demonstrate HIIT safety and superior efficacy in stable CHF, post-MI, and post-CABG patients

C. HIIT requires no monitoring

D. HIIT is never as effective as MICT

✓ Answer: B

💡 **Rationale & Explanation:**

HIIT in cardiac rehabilitation evidence: SMARTEX-HF TRIAL (Wisløff et al.): HIIT in stable CHF → significantly greater VO2max improvement than MICT; comparable adverse event rates. NODRHEART TRIAL: post-MI HIIT → superior VO2max; no increased adverse events. META-ANALYSES (2018, 2020): HIIT consistently produces ~15-20% greater VO2max improvement vs. MICT in cardiac patients; adverse event rates during HIIT sessions are low (<1 event per 1000 patient-hours of HIIT) and comparable to MICT. ABSOLUTE CONTRAINDICATIONS to HIIT (do not apply MICT limits to HIIT): unstable angina, recent acute event (<2 weeks), decompensated HF, severe valve disease, uncontrolled arrhythmias. For stable cardiac patients cleared for vigorous exercise: HIIT is a legitimate and effective option within structured cardiac rehabilitation.

├─ PHYSICAL AGENTS

299. The 'PEACE & LOVE' acronym for acute injury management replaces RICE because:

A. RICE was never used

B. PEACE & LOVE recognizes that AVOIDING ANTI-INFLAMMATORIES (the 'A' in PEACE) promotes better long-term tissue healing — NSAIDs and ice may impair the inflammatory phase that is NECESSARY for proper tissue repair and regeneration; instead, OPTIMAL LOADING begins early in the LOVE phase

C. RICE is still the standard

D. Only for sports injuries

✓ **Answer: B**

💡 **Rationale & Explanation:**

PEACE & LOVE (Dubois & Esculier, 2020): PEACE phase (first days): P=Protection; E=Elevation; A=Avoid anti-inflammatory modalities (ice, NSAIDs); C=Compression; E=Education (active recovery, realistic expectations). LOVE phase (subsequent days): L=Load (optimal loading/progressive exercise); O=Optimism (positive expectations); V=Vascularization (cardiovascular activity); E=Exercise (specific rehabilitation). KEY PARADIGM SHIFT: AVOIDING ANTI-INFLAMMATORIES — the inflammatory phase is a NECESSARY and BENEFICIAL part of normal tissue healing; early use of NSAIDs and prolonged icing may delay healing by suppressing the macrophage activity, angiogenesis, and fibroblast activation that are triggered by inflammation. EVIDENCE: observational and basic science evidence supports this framework; RCTs specifically testing the PEACE & LOVE protocol vs. RICE are still emerging.

├─ CARDIOPULMONARY PT

300. The 'ACSM FITT-VP' principle adds VP to FITT where V = Volume and P = Progression. For healthy adults, the WEEKLY VOLUME TARGET for aerobic training is:

A. 100 METs-min/week

B. 500-1000 METs-MINUTES PER WEEK — the recommended volume equivalent to the Physical Activity Guidelines (150-300 min/week moderate + 75-150 min/week vigorous); each minute of moderate exercise = approximately 4-6 METs → 150 min × 4-6 METs = 600-900 METs-min; below 500 MET-min/week = insufficient for health benefit; above 1000 may provide additional benefit but with diminishing returns

C. 50 METs-min/week

D. 2000 METs-min/week

✓ **Answer: B**

💡 **Rationale & Explanation:**

FITT-VP volume for cardiorespiratory training: VOLUME = total exercise energy expenditure; expressed as METs-minutes (MET value of activity × minutes performed) or KCAL or total minutes. TARGET: 500-1000 MET-min/week for MODERATE-VIGOROUS activity. CALCULATION: 30 min of walking at 4 METs × 5 days = 600 MET-min/week (in the target range). PROGRESSION ('P'): increase volume by no more than 10-20% per week to allow adaptation and prevent overtraining injury. INITIAL VOLUME: very deconditioned patients may start at 150-300 MET-min/week and progress over months. The FITT-VP framework provides a comprehensive, individualized exercise prescription that goes beyond simple frequency and duration to include total dose (volume) and the rate of dose escalation (progression).

S5
Professional Practice, Ethics, Jurisprudence & Administration
Philippine PT Laws, Ethics, Research, Documentation & Healthcare Systems

├─ PHILIPPINE PT LAW

1. Republic Act 10210 is known as:

A. The Physical Therapy and Occupational Therapy Act (RA 5680)

B. The Philippine Physical Therapy Act of 2012 (standalone PT law)

C. The Philippine Medical Act

D. The Nursing Act

✓ Answer: B

💡 Rationale & Explanation:

RA 10210 = THE PHILIPPINE PHYSICAL THERAPY ACT OF 2012 — the current governing law for PT practice in the Philippines. It replaced and expanded RA 5680 (which combined PT and OT). RA 10210 created a PT-exclusive board examination, established the Philippine Board of Physical Therapy (PBPT) under the PRC, updated PT scope of practice, and set educational requirements. Key provisions: only licensed RPTs can practice PT; PT boards have 5 members appointed by the President; the examination requires graduation from an accredited BSPT program. EVERY Philippine PT must know this law.

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2. Under RA 10210, the minimum educational requirement to take the Philippine PT board examination is:

A. Associate degree (2-year course) in any health science

B. Completion of a Bachelor of Science in Physical Therapy (BSPT) from a CHED-recognized institution

C. Master's degree in Physical Therapy

D. Diploma course in PT with 1-year clinical internship

✓ Answer: B

💡 **Rationale & Explanation:**

RA 10210 requires: Bachelor of Science in Physical Therapy (BSPT) degree from a Commission on Higher Education (CHED) recognized institution. The curriculum includes: basic sciences, clinical sciences, physical therapy procedures, supervised clinical internship (1000+ clinical hours), and thesis/research component. Upon passing the boards: you receive a Certificate of Registration and Professional Identification Card, valid for 3 years, renewable every 3 years with CPE compliance.

├─ ETHICS

3. The bioethical principle of 'BENEFICENCE' means:

A. Treating all patients equally regardless of background

B. Doing GOOD and acting in the patient's best interest

C. Avoiding harm to the patient (do no harm)

D. Respecting the patient's right to make decisions

✓ Answer: B

💡 **Rationale & Explanation:**

The four principles of biomedical ethics (Beauchamp and Childress): 1) Autonomy = respect patient's right to make informed decisions; 2) Beneficence = DO GOOD — actively promote the patient's welfare; 3) Non-maleficence = DO NO HARM (Primum non nocere); 4) Justice =

fair, equitable treatment. In PT: Beneficence = choosing treatments with proven benefit; Non-maleficence = not using harmful techniques. The difference: beneficence = active positive action; non-maleficence = avoiding negative action. Both often must be balanced (e.g., a painful but beneficial treatment tests both principles).

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4. Informed consent in physical therapy requires the patient understands:

A. The diagnosis only

B. The proposed intervention, its purpose, risks, benefits, alternatives, and the right to refuse

C. The billing and insurance codes for the treatment

D. The therapist's academic qualifications

✓ Answer: B

💡 **Rationale & Explanation:**

Informed consent requires the patient to understand: 1) NATURE of the proposed treatment; 2) PURPOSE (why it's needed); 3) RISKS AND BENEFITS; 4) ALTERNATIVES (including no treatment); 5) Right to WITHDRAW CONSENT at any time. The consent must be: VOLUNTARY (no coercion), INFORMED (adequate information), COMPETENT (patient has decision-making capacity). Documentation of consent in the medical record is essential. In Philippine PT practice, formal written consent is needed for high-risk procedures, but informed consent is ethically required for ALL PT interventions.

├─ RESEARCH & EBP

5. The level of evidence HIGHEST in the evidence hierarchy is:

A. Expert opinion

B. Single randomized controlled trial (RCT)

C. Systematic review / meta-analysis of RCTs

D. Case-control study

✓ Answer: C

💡 **Rationale & Explanation:**

Evidence hierarchy (strongest to weakest): 1) SYSTEMATIC REVIEW / META-ANALYSIS (pools data from multiple RCTs — highest level); 2) Randomized Controlled Trial (RCT) — single study; 3) Cohort studies; 4) Case-control studies; 5) Case series / Case reports; 6) Expert opinion (lowest). Why systematic reviews are highest: they reduce bias by including all relevant studies with strict methodology, and meta-analysis pools statistics to increase power. In EBP, you apply the best evidence to clinical decisions while considering patient values and clinical expertise.

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6. The concept of SENSITIVITY in a diagnostic test refers to:

A. The probability that a positive test means the patient truly has the condition

B. The probability that a negative test means the patient truly does NOT have the condition

C. The ability of the test to correctly identify patients WHO HAVE the condition (true positive rate)

D. The percentage of correct results out of all tests performed

✓ Answer: C

💡 **Rationale & Explanation:**

Sensitivity = ability to detect TRUE POSITIVES = True Positives / (True Positives + False Negatives). Mnemonic: 'SnNout' = SENSITIVE test, NEGATIVE result = RULES OUT the disease. Specificity = ability to identify TRUE NEGATIVES. Mnemonic: 'SpPin' = SPECIFIC test, POSITIVE result = RULES IN the disease. Example: SLR has HIGH sensitivity (few missed true positives) but LOW specificity. Spurling's has LOW sensitivity but HIGH specificity. Use sensitive tests to SCREEN (catch everything); use specific tests to CONFIRM.

├─ DOCUMENTATION

7. The SOAP note format stands for:

A. Strength, Objective, Assessment, Plan

B. Subjective, Objective, Assessment, Plan

C. Structure, Outcome, Activity, Participation

D. Subjective, Observation, Aim, Protocol

✓ Answer: B

💡 **Rationale & Explanation:**

SOAP notes: S = Subjective (what the PATIENT says — chief complaint, pain level, functional limitations in their own words); O = Objective (what the THERAPIST MEASURES — vital signs, ROM measurements, MMT grades, special tests, functional performance — measurable, observable data); A = Assessment (clinical interpretation — diagnosis, progress toward goals, clinical reasoning); P = Plan (treatment plan — interventions, home program, goals, frequency/duration, referrals). SOAP notes are the standard documentation format in Filipino healthcare. 'If it's not documented, it wasn't done' — critical for legal and insurance purposes.

├— ETHICS

8. A physical therapist discovers a colleague is practicing with an expired license. The appropriate professional response is:

A. Ignore it — it's not your business

B. Report the situation to the Philippine Board of Physical Therapy (PBPT) or relevant regulatory authority

C. Confront the colleague aggressively in front of patients

D. Ask the patients to find another therapist without explanation

✓ Answer: B

💡 **Rationale & Explanation:**

Ethical and professional obligation: PTs have a duty to uphold the profession's integrity and public safety. Practicing without a valid

license is ILLEGAL under RA 10210 and endangers patients. Appropriate response: confirm the information; then report to the Philippine Board of Physical Therapy (PBPT) or the Professional Regulation Commission (PRC). You can also inform the facility administration. Ignoring it = you become complicit. Confronting publicly = unprofessional. The ethical code requires therapists to report professional misconduct — this protects the public AND the profession.

RESEARCH & EBP

9. A number needed to treat (NNT) of 5 means:

A. 5 sessions are needed to see improvement

B. 5 patients must receive the treatment for one patient to benefit compared to control

C. 5% of patients improve with the treatment

D. The treatment is 5 times more effective than placebo

✓ Answer: B

💡 **Rationale & Explanation:**

NNT (Number Needed to Treat) = 1 / Absolute Risk Reduction. NNT = 5 means: for every 5 patients who receive the treatment, ONE patient benefits who would NOT have benefited from the control. Lower NNT = more effective treatment. NNT of 1 = every patient benefits (perfect treatment). Example: if manual therapy gives 60% improvement vs 40% with exercise alone: ARR = 20% = 0.20. NNT = 1/0.20 = 5. NNT helps clinicians make practical decisions about treatment value. A treatment with NNT of 3-5 is generally considered clinically worthwhile.

DOCUMENTATION

10. Goal writing in PT using the SMART framework requires goals to be:

A. Simple, Manageable, Applicable, Reasonable, Timely

B. Specific, Measurable, Achievable, Relevant, Time-bound

C. Subjective, Meaningful, Accurate, Realistic, Therapeutic

D. Structured, Motivational, Activity-based, Risk-free, Targeted

✓ Answer: B

💡 **Rationale & Explanation:**

SMART goals: Specific (what EXACTLY will the patient do — 'walk 50 meters'), Measurable (quantifiable — not 'will improve walking'), Achievable (realistic given the patient's condition), Relevant (meaningful to the patient and related to function), Time-bound (by a specific date — 'by discharge in 2 weeks'). Example of SMART goal: 'Patient will independently ambulate 200 feet on a level surface with a standard cane in 4 weeks.' Non-SMART: 'Patient will improve gait.' Good goal writing is essential for: documentation quality, tracking progress, communicating with the team, and insurance approval.

├─ PROFESSIONAL PRACTICE

11. Continuing Professional Education (CPE) credits for PT license renewal in the Philippines require:

A. 15 CPE units per year for renewal

B. A minimum of 45 CPE units every 3 years (PRC requirement)

C. 100 CPE units every 5 years

D. No CPE required — renewal is automatic with fee payment

✓ Answer: B

💡 **Rationale & Explanation:**

PRC Continuing Professional Education (CPE) for PT license renewal in the Philippines: 45 CPE units every 3 years (the professional identification card is valid for 3 years and must be renewed with proof of CPE compliance). Sources of CPE units: formal training, seminars,

conferences, publication of research, teaching in PT programs, and professional services. CPE keeps PTs updated on current evidence and practice. Failure to complete required CPE units means inability to renew the license — effectively suspending practice.

ETHICS

12. When a patient declines a recommended treatment intervention, the PT's ethical response is to:

A. Insist on the treatment regardless — the PT knows best

B. Document the refusal, ensure the patient understands the consequences, respect the decision, and explore alternatives

C. Discharge the patient immediately for non-compliance

D. Inform the patient's family and ask them to convince the patient

✓ Answer: B

💡 **Rationale & Explanation:**

Patient refusal = patient AUTONOMY exercised. The PT's response: 1) Ensure the patient has COMPLETE INFORMATION about why the treatment is recommended and what happens if declined; 2) Explore the reason for refusal (fear? cultural belief? cost? misunderstanding?); 3) DOCUMENT the refusal in the medical record (protects the therapist legally); 4) Explore ALTERNATIVES; 5) RESPECT the patient's decision — you cannot force treatment on a competent adult. Forcing treatment despite refusal = BATTERY (unlawful touching). Discharging immediately is premature. Document everything.

RESEARCH & EBP

13. In a randomized controlled trial (RCT), RANDOMIZATION serves to:

A. Ensure all patients get the same treatment

B. Equally distribute known AND unknown confounding variables between groups, reducing bias

C. Allow the researcher to choose who gets the treatment

D. Make the sample size larger

✓ Answer: B

💡 **Rationale & Explanation:**

Randomization: assigning participants to treatment or control groups BY CHANCE. Purpose: distributes BOTH KNOWN and UNKNOWN confounding variables equally between groups. After proper randomization, differences in outcomes are more likely attributable to the treatment itself. ALLOCATION CONCEALMENT (hiding the allocation sequence from the recruiter) is just as important as randomization to prevent selection bias. The RCT is the gold standard for determining treatment efficacy because randomization controls for confounders.

├─ ETHICS

14. A patient asks the PT to keep certain sensitive health information confidential and not share with family members. The appropriate response is:

A. Tell the family — they have a right to know

B. Respect the patient's confidentiality unless there is risk of harm to the patient or others

C. Ask the patient to keep secrets themselves

D. Document the information but tell the referring physician everything

✓ Answer: B

💡 **Rationale & Explanation:**

Confidentiality: PT is ethically and legally bound to protect patient health information. The patient's information belongs to the PATIENT — not the family. Exceptions to confidentiality: imminent risk of serious harm to the patient or others; mandatory reporting of child

abuse, elder abuse; public health threats (communicable diseases). When in doubt: honor confidentiality. In the Philippines: Data Privacy Act (RA 10173) protects health information. Violating confidentiality is unethical, potentially illegal, and damages the therapeutic relationship.

├─ PROFESSIONAL PRACTICE

15. The PT's scope of practice in the Philippines (RA 10210) includes all EXCEPT:

A. Evaluation and assessment of physical and functional abilities

B. Application of physical agents, exercise, and manual techniques

C. Prescription and dispensing of pharmaceutical drugs

D. Rehabilitation planning and patient/caregiver education

✓ Answer: C

💡 **Rationale & Explanation:**

RA 10210 PT scope of practice: Assessment/evaluation; Patient examination; PT diagnosis; Prognosis and plan of care; Physical agents (heat, cold, electricity, light, sound); Therapeutic exercise; Manual therapy techniques; Functional mobility training; Assistive device prescription; Patient/caregiver education; Research and consultation. OUTSIDE scope: prescribing or dispensing pharmaceutical drugs (that's the physician's and pharmacist's domain); surgical interventions; radiological procedures. Know the boundaries of your scope — critical for boards AND practice.

├─ RESEARCH & EBP

16. The MINIMAL CLINICALLY IMPORTANT DIFFERENCE (MCID) in outcome measures is defined as:

A. The statistical significance threshold ($p < 0.05$)

B. The smallest change in an outcome measure that patients perceive as meaningful or important

C. The maximum score achievable on a functional scale

D. The standard deviation of measurements in a normal population

✓ Answer: B

💡 **Rationale & Explanation:**

MCID: the SMALLEST change in an outcome measure score that patients consider IMPORTANT and meaningful — not just statistically different. Why it matters: a treatment might produce a statistically significant 2-point improvement on a 0-100 scale, but if the MCID is 10 points, that 2-point change means NOTHING to the patient functionally. MCID anchors research findings to real patient experience. Examples: ODI (back pain) MCID ≈ 10 points; VAS pain MCID ≈ 15-20mm; 6MWT MCID for COPD ≈ 25-30m. This is the essence of patient-centered outcome measurement.

ETHICS

17. Dual-role relationship in physical therapy ethics refers to:

A. A therapist who treats two patients simultaneously

B. A therapist who also serves as a supervisor or administrator

C. A professional relationship compromised by a concurrent personal or financial relationship (e.g., treating family members or friends)

D. Having both PT and OT licensure

✓ Answer: C

💡 **Rationale & Explanation:**

Dual-role (dual relationship): when a PT has BOTH a professional (therapeutic) AND a personal, financial, or supervisory relationship with the same person. Examples: treating a family member, close friend, business partner, or romantic interest. Ethical concern: dual roles compromise OBJECTIVITY (you may under- or over-treat due to personal feelings) and BOUNDARIES. Best practice: AVOID treating

family members or close friends. If unavoidable (in remote areas), document careful reasoning and seek supervision. The PT code of ethics explicitly discourages dual relationships that could compromise professional judgment.

RESEARCH & EBP

18. Interrater reliability of a clinical measurement tool assesses:

A. Whether the same therapist gets the same result on two separate occasions

B. Whether different examiners get the same result when measuring the same patient

C. Whether the test measures what it claims to measure

D. Whether the test accurately predicts a future clinical outcome

✓ Answer: B

💡 **Rationale & Explanation:**

Reliability types: INTERRATER reliability = consistency BETWEEN different examiners measuring the same thing. INTRARATER reliability = consistency of the SAME examiner on repeated occasions. Measured by Intraclass Correlation Coefficient (ICC): 0-0.5 = poor, 0.5-0.75 = moderate, 0.75-0.9 = good, >0.9 = excellent. Validity = whether the test measures what it CLAIMS to measure. Responsiveness = sensitivity to change over time. ICC >0.75 is the minimum acceptable for clinical tools. Essential for selecting outcome measures in PT practice.

ETHICS

19. The principle of JUSTICE in healthcare ethics includes:

A. Doing what is most beneficial for the patient individually only

B. Fair distribution of healthcare resources and equitable treatment of all patients regardless of background

C. Following the patient's instructions even against medical advice

D. Avoiding all potentially harmful procedures

✓ **Answer: B**

💡 **Rationale & Explanation:**

Justice in healthcare: FAIR DISTRIBUTION of benefits and burdens. Distributive justice (allocating healthcare resources fairly — who gets what treatment, prioritization based on need); Procedural justice (fair processes — consistent application of rules). In PT practice: treating all patients with equal quality of care regardless of socioeconomic status, race, religion, or diagnosis. In the Philippines' public health context: PT should be accessible to all — advocating for free/subsidized PT services is an act of social justice.

├— PROFESSIONAL PRACTICE

20. When a licensed PT signs and seals PT documents, they are PRIMARILY responsible for:

A. Only the clerical accuracy of the document

B. The professional accuracy, validity, and content of the document they certify

C. The patient's outcome only if it involves litigation

D. Insurance billing codes assigned by the billing department

✓ **Answer: B**

💡 **Rationale & Explanation:**

When a licensed PT signs, seals, and affixes their license number to a document (evaluation report, medical certificate, progress note), they take PROFESSIONAL RESPONSIBILITY for the accuracy, validity, and clinical content of that document. Falsification, misrepresentation, or negligence in a signed PT document can result in: professional disciplinary action by the PBPT/PRC, civil liability, and potentially criminal liability (if fraudulent). PTs should NEVER sign documents for

assessments they did not perform. The 'assistant PT' or intern's work must be reviewed and signed by the supervising licensed PT.

├— PHILIPPINE PT LAW

21. The Philippine Physical Therapy Act (RA 10210) allows PTs to practice in which settings?

A. Hospitals only

B. Hospitals, clinics, schools, sports facilities, corporate wellness, home health, research institutions, and all settings requiring PT services

C. Government hospitals only

D. Urban areas only

✓ Answer: B

💡 **Rationale & Explanation:**

RA 10210 allows PT practice in ALL settings where PT services are needed: hospitals (government and private), rehabilitation centers, clinics (outpatient), schools and universities, sports facilities and teams, corporate wellness programs, community health centers, home health care, research institutions, and international settings. The Philippine PT profession has expanded beyond traditional hospital settings to community-based rehabilitation (CBR), sports PT, occupational health, and telehealth. PTs practicing in any of these settings must hold a valid, current professional identification card from the PRC and comply with all RA 10210 provisions.

├— ETHICS

22. The concept of 'therapeutic privilege' in medical ethics means:

A. The therapist has special privileges not available to other professionals

B. Withholding information from a patient because disclosure might harm them — generally NOT accepted in modern ethics

C. The right to treat patients without their consent in emergencies

D. The legal immunity of healthcare providers from malpractice

✓ Answer: B

💡 **Rationale & Explanation:**

Therapeutic privilege: the historically held notion that a physician or therapist can withhold information from a patient IF they believe that disclosure would cause psychological harm or interfere with treatment. MODERN ETHICS largely REJECTS therapeutic privilege because: 1) It infantilizes patients (paternalism); 2) It violates autonomy; 3) Patients have a right to information about their own care; 4) It's based on the provider's assumption of what will harm the patient. The correct approach: provide complete, accurate information in a SENSITIVE, EMPATHETIC manner. If you're concerned about psychological impact, enlist mental health support — don't withhold information. Therapeutic privilege is rarely if ever acceptable in contemporary PT ethics.

├— RESEARCH & EBP

23. Systematic error (BIAS) in research refers to:

A. Random variation in measurement

B. A consistent deviation of results in a particular direction due to flaws in study design, data collection, or analysis

C. Normal statistical variation around the mean

D. The standard deviation of the sample

✓ Answer: B

💡 **Rationale & Explanation:**

BIAS (systematic error): a consistent, directional ERROR that produces results that are systematically too high or too low — it DOES NOT 'average out' with larger samples (unlike random error). Types:

SELECTION BIAS (systematic differences in who is selected for study groups); INFORMATION BIAS (systematic errors in data collection — measurement bias, interviewer bias, recall bias); CONFOUNDING (a third variable distorts the apparent relationship between two variables). Randomization, blinding, and allocation concealment reduce bias. In PT research: therapist-administered outcomes (like MMT) can be subject to measurement bias if the therapist knows the treatment group — this is why BLINDED assessors are used in RCTs.

├─ DOCUMENTATION

24. Problem-Oriented Medical Records (POMR) use a structured approach that includes:

A. Only the SOAP note format

B. A master problem list, initial plan for each problem, SOAP notes (progress notes), and discharge summary

C. Flowcharts only for vital signs

D. A single narrative note without structure

✓ Answer: B

💡 **Rationale & Explanation:**

Problem-Oriented Medical Record (POMR — developed by Lawrence Weed): a structured approach to medical documentation. Components: 1) DATABASE (history, physical exam, lab results); 2) PROBLEM LIST (numbered list of ALL active problems — medical, PT, psychosocial); 3) INITIAL PLAN for each numbered problem (diagnostic plan, treatment plan, patient education plan); 4) PROGRESS NOTES in SOAP format keyed to each problem number; 5) DISCHARGE SUMMARY. POMR ensures all problems are addressed systematically, improves communication, and prevents problems from being overlooked. The problem list is often called the 'table of contents' of the medical record. Still widely used in Philippine hospitals.

PROFESSIONAL PRACTICE

25. In the Philippines, the Professional Regulation Commission (PRC) is responsible for:

A. Governing only medical doctors

B. Regulating and supervising the registration, licensure, and practice of all regulated professions including PT, through the various professional regulatory boards

C. Setting curriculum standards for PT programs

D. Hiring healthcare professionals in government hospitals

✓ Answer: B

💡 Rationale & Explanation:

The Professional Regulation Commission (PRC) in the Philippines: a government agency under the Office of the President. Its mandate is to REGULATE and SUPERVISE the registration, licensure, and practice of all professionals covered by the Professional Regulation Commission Act. PRC administers licensure examinations through professional regulatory boards (like the Philippine Board of Physical Therapy — PBPT). PRC also: issues professional identification cards, enforces the Code of Ethics, imposes disciplinary sanctions, and administers CPE requirements. CHED (Commission on Higher Education) handles CURRICULUM standards for PT programs — that is separate from PRC's role. All RPTs must be registered with the PRC.

RESEARCH & EBP

26. Cohen's kappa coefficient (κ) is used to measure:

A. Effect size in clinical trials

B. Agreement between two raters beyond chance (inter-rater reliability for categorical data)

C. The correlation between two continuous variables

D. The internal consistency of a questionnaire

✓ **Answer: B**

💡 **Rationale & Explanation:**

Cohen's Kappa (κ): measures INTER-RATER AGREEMENT for CATEGORICAL DATA (e.g., two therapists both classifying the same patient's pain as 'mild,' 'moderate,' or 'severe'). It CORRECTS FOR CHANCE agreement — unlike simple percent agreement. Interpretation: κ <0.20 = slight agreement; 0.21-0.40 = fair; 0.41-0.60 = moderate; 0.61-0.80 = substantial; 0.81-1.0 = almost perfect. Contrast: ICC (Intraclass Correlation Coefficient) is used for CONTINUOUS data (e.g., goniometric ROM measurements). Cronbach's alpha measures INTERNAL CONSISTENCY of a scale (how well the items hang together). Knowing which statistical tool to use for which type of data is a key EBP competency.

├─ ETHICS

27. In a situation where a patient's family requests information about the patient's prognosis without the patient's consent, the PT should:

A. Share all clinical information freely — family has a right to know

B. Politely decline to share without the patient's explicit consent, unless the patient is incapacitated or has pre-authorized information sharing

C. Provide a vague summary to satisfy the family

D. Ask the family to sign a form and share everything

✓ **Answer: B**

💡 **Rationale & Explanation:**

Patient confidentiality extends to the FAMILY — unless: 1) The patient has explicitly given consent for family to receive information; 2) The patient lacks decision-making capacity (then the surrogate/family may be the appropriate recipient); 3) There is a legal mandate to disclose. In Philippine culture, family involvement in healthcare is deeply valued

— but ethically, the PATIENT's right to privacy prevails. The PT should: explain to the family why information cannot be shared without consent; encourage them to speak DIRECTLY with the patient; if the patient is capacitated, ask the patient if they wish to authorize family information sharing. Document this discussion.

RESEARCH & EBP

28. A clinical prediction rule (CPR) in PT is used to:

A. Predict the costs of PT intervention

B. Identify a subgroup of patients likely to respond to a specific treatment based on clinical examination findings

C. Schedule patient appointments optimally

D. Predict staff turnover in PT departments

✓ Answer: B

💡 **Rationale & Explanation:**

Clinical Prediction Rules (CPRs): statistical tools that combine multiple clinical examination findings to predict: 1) PROGNOSIS (likelihood of recovery); 2) DIAGNOSIS (probability of a specific condition); 3) TREATMENT RESPONSE (likelihood of benefiting from a specific intervention). Famous examples: Wainner's CPR for cervical radiculopathy (4 factors: Spurling's positive, distraction positive, ipsilateral rotation <60°, ULTT-A positive — 4/4 = 99% probability of radiculopathy); Flynn's CPR for lumbar manipulation (5 factors: symptom duration <16 days, no symptoms distal to the knee, FABQ work subscale <19, hip IR >35°, hypomobility in lumbar spine — 4/5 factors → 95% probability of success with manipulation). CPRs guide clinical decision making.

HEALTHCARE ADMINISTRATION

29. 'Interprofessional collaboration' (IPC) in the rehabilitation team means:

A. Each profession working independently with separate treatment goals

B. Healthcare professionals from different disciplines working together with shared goals, mutual respect, and integrated care plans for the patient

C. The PT managing all other healthcare professionals on the team

D. Consultation by phone or written referral only between professions

✓ Answer: B

💡 **Rationale & Explanation:**

Interprofessional collaboration (IPC): an approach where healthcare professionals from DIFFERENT disciplines (PT, OT, SLP, nursing, medicine, social work, psychology) work TOGETHER, share information, and coordinate care with SHARED GOALS centered on the patient. Key features: mutual respect and trust; shared decision-making; integrated care plans; regular team meetings; shared documentation. Benefits: better patient outcomes, reduced errors, improved efficiency, higher patient satisfaction. In rehabilitation: the PT, OT, SLP, nurse, and physician must communicate regularly about the patient's functional goals, discharge planning, and barriers to recovery. The patient (and family) is an ACTIVE MEMBER of the interprofessional team.

├─ PROFESSIONAL PRACTICE

30. What is the minimum supervised clinical training hours required for a BSPT graduate in the Philippines?

A. 300 hours

B. 500 hours

C. At least 1000 hours of supervised clinical internship

D. 2000 hours of total clinical exposure

✓ **Answer: C**

💡 **Rationale & Explanation:**

Philippine BSPT programs, as per CHED curriculum requirements and RA 10210 provisions, require a minimum of AT LEAST 1000 HOURS of supervised clinical internship (clinical clerkship). This internship covers all clinical areas: musculoskeletal, neurological, cardiopulmonary, pediatric, and community/home health settings. The internship is supervised by a licensed RPT. It provides students the opportunity to apply classroom knowledge in real clinical settings under supervision, develop professional competencies, and gain confidence in PT practice. After completing the internship and graduating from an accredited BSPT program, the graduate is eligible to take the PRC licensure examination.

ETHICS

31. A PT student on clinical placement witnesses a licensed PT performing an unethical procedure on a patient. The student's most appropriate action is:

A. Report immediately to social media to protect the public

B. Ignore it — it is the licensed PT's responsibility

C. Document the incident and report it to the clinical supervisor, academic institution, and if necessary, the PRC/PBPT

D. Directly confront the PT in front of the patient

✓ **Answer: C**

💡 **Rationale & Explanation:**

PT students on clinical placement are bound by the same ethical code as licensed PTs — they are future PT professionals and have an obligation to uphold ethical standards. Steps: 1) Document what was observed (date, time, what happened, who was present); 2) Report to the CLINICAL SUPERVISOR (immediate chain of command); 3) If no action is taken or the supervisor is involved, report to the ACADEMIC

INSTITUTION's clinical education coordinator; 4) For serious violations, report to the PBPT/PRC. NEVER confront aggressively in front of patients (disturbs care, not professional). NEVER post on social media (breaches confidentiality, potential defamation). The reporting obligation is an ethical duty, not optional — 'seeing something and saying nothing' makes you complicit.

├─ RESEARCH & EBP

32. A 'systematic review' differs from a 'narrative review' in that:

A. Systematic reviews include fewer studies

B. Systematic reviews use EXPLICIT, REPRODUCIBLE SEARCH STRATEGIES and PREDEFINED INCLUSION/EXCLUSION CRITERIA to minimize selection bias; narrative reviews use the author's judgment to select studies

C. Narrative reviews have higher levels of evidence

D. Systematic reviews only include RCTs, while narrative reviews include all study types

✓ Answer: B

💡 **Rationale & Explanation:**

SYSTEMATIC REVIEW: uses a COMPREHENSIVE, REPRODUCIBLE literature search (multiple databases, specific search terms, date ranges), PREDEFINED INCLUSION/EXCLUSION CRITERIA (applied consistently), QUALITY ASSESSMENT of each included study (GRADE, PEDro scale, Cochrane risk of bias), and synthesis of results (qualitative or meta-analysis). Purpose: MINIMIZE BIAS in selecting and synthesizing evidence. NARRATIVE REVIEW: the author selects studies based on personal knowledge and judgment — susceptible to SELECTION BIAS (cherry-picking). Lower in the evidence hierarchy. Systematic reviews ± meta-analysis = the GOLD STANDARD of synthesized evidence. The Cochrane Collaboration and PEDRO database are primary sources of PT-relevant systematic reviews.

PROFESSIONAL PRACTICE

33. The PAPT (Philippine Association of Physical Therapists) is:

A. A government regulatory body that issues PT licenses

B. The primary professional organization of PTs in the Philippines — advocates for the profession, sets continuing education standards, and represents Filipino PTs nationally and internationally

C. A branch of the Department of Health

D. The accrediting body for BSPT programs

✓ Answer: B

💡 **Rationale & Explanation:**

Philippine Association of Physical Therapists (PAPT): the primary PROFESSIONAL ORGANIZATION (not regulatory body) for PTs in the Philippines. Founded in 1961. Functions: Professional ADVOCACY (lobbying for PT interests, updating laws and regulations); Continuing Professional Development (CPD — organizing seminars, conferences for CPE credit); Maintaining STANDARDS of practice; Representing Filipino PTs in international organizations (World Confederation for Physical Therapy — WCPT, now WORLD PHYSIOTHERAPY); PAPT Special Interest Groups (sports PT, neurology, cardiopulmonary, etc.). Every licensed PT is encouraged to be a PAPT member, though it's voluntary. PAPT membership ≠ PRC registration — these are separate. PAPT and the PBPT work together but are different entities.

RESEARCH & EBP

34. An 'intention to treat' (ITT) analysis in an RCT means:

A. Only patients who completed the study are included in the final analysis

B. ALL randomized patients are included in the analysis in their ASSIGNED groups, regardless of whether they actually received or completed the treatment

C. Only patients who strictly followed the protocol are analyzed

D. The analysis excludes patients who dropped out

✓ Answer: B

💡 **Rationale & Explanation:**

Intention to Treat (ITT) analysis: the GOLD STANDARD approach for RCT analysis. ALL RANDOMIZED PATIENTS are analyzed in their ASSIGNED groups, regardless of: whether they actually received the treatment, whether they complied with the protocol, whether they dropped out. Purpose: PRESERVES the benefit of RANDOMIZATION — if you exclude dropouts, the groups may no longer be balanced (selection bias). ITT gives a 'real-world' effectiveness estimate (including non-compliance and dropouts). Per-Protocol analysis: only includes patients who followed the protocol — can overestimate treatment efficacy. Modified ITT: includes patients who received at least one treatment session. For PT boards: ITT = ALL randomized patients analyzed in their assigned group = preferred analysis.

├─ ETHICS

35. 'Veracity' as an ethical principle in healthcare means:

A. Respecting patient autonomy

B. The obligation to TELL THE TRUTH to patients, even when the truth is difficult

C. Distributing healthcare resources fairly

D. Avoiding harm to patients

✓ Answer: B

💡 **Rationale & Explanation:**

Veracity (truth-telling): the ethical obligation to be HONEST with patients — provide accurate information, not deceive, not withhold

information for convenience. Components: giving complete and accurate information (informed consent); correcting patient misconceptions; not exaggerating treatment benefits or minimizing risks; honesty about prognosis. Veracity can create ethical tension with BENEFICENCE — sometimes truth may cause anxiety (e.g., a poor prognosis). Modern ethics resolves this: provide truth in a SENSITIVE, COMPASSIONATE manner with appropriate support — do not withhold it paternalistically. In PT: being honest about realistic rehabilitation goals, treatment timelines, and what the evidence says about a treatment approach. Patients who receive honest information make better decisions and trust their PT more.

├— HEALTHCARE ADMINISTRATION

36. The 'Plan-Do-Study-Act' (PDSA) cycle is used in healthcare for:

A. Diagnosing patient conditions

B. Continuous quality improvement — systematically testing and implementing changes in clinical processes

C. Financial planning in PT departments

D. Research study design

✓ Answer: B

💡 Rationale & Explanation:

PDSA Cycle (Deming Cycle): a QUALITY IMPROVEMENT methodology used in healthcare: PLAN — identify the problem, set improvement goals, plan a change/test; DO — implement the change on a small scale; STUDY — analyze the results, did the change work?; ACT — if successful, scale up; if not, modify the plan and start again. Example in PT: Problem = patients often don't receive their home exercise program. PLAN: design a standardized HEP checklist. DO: use the checklist for 10 patients. STUDY: check if HEP compliance improved. ACT: if yes, implement for all patients; if no, modify the checklist. PDSA is the basis of hospital quality programs (Joint Commission, PhilHealth

accreditation). PT managers and senior clinicians should be familiar with this cycle.

├— PROFESSIONAL PRACTICE

37. Under RA 10210, the penalty for practicing physical therapy without a license in the Philippines includes:

A. Warning letter only

B. Fine and/or imprisonment according to the Professional Regulation Commission Act provisions

C. Community service only

D. No specific penalty — just removal from practice

✓ Answer: B

💡 Rationale & Explanation:

RA 10210 and the Professional Regulation Commission Act: the unlicensed practice of a regulated profession (including Physical Therapy) in the Philippines is a CRIMINAL OFFENSE with penalties including: FINE (specific amounts as provided in the PRC Act and RA 10210 implementing rules) and/or IMPRISONMENT. The PRC has the authority to: revoke, suspend, or cancel licenses for violations; recommend criminal prosecution for unlicensed practice. Additionally, the facility employing an unlicensed PT can also face penalties. This strong regulatory framework protects the public from unqualified practitioners. As a licensed PT, you also have the obligation to report known unlicensed practice to the PBPT or PRC.

├— RESEARCH & EBP

38. The PEDro scale (Physiotherapy Evidence Database scale) is used to:

A. Measure patient pain levels

B. Assess the METHODOLOGICAL QUALITY of randomized controlled trials in physiotherapy

C. Classify patients by functional ability

D. Score the quality of systematic reviews

✓ **Answer: B**

💡 **Rationale & Explanation:**

PEDro scale: an 11-item checklist for assessing the METHODOLOGICAL QUALITY of randomized controlled trials (RCTs) in physiotherapy. Items: 1) Eligibility criteria specified; 2) RANDOM ALLOCATION; 3) ALLOCATION CONCEALMENT; 4) BASELINE COMPARABILITY; 5) BLINDED SUBJECTS; 6) BLINDED THERAPISTS; 7) BLINDED ASSESSORS; 8) ADEQUATE FOLLOW-UP (>85%); 9) ITT ANALYSIS; 10) BETWEEN-GROUP COMPARISONS; 11) POINT ESTIMATES + VARIABILITY. Score: 0-10 (item 1 not scored). Score ≥6/10 = high methodological quality. The PEDro database (hosted by the University of Sydney) provides free access to thousands of PT RCTs with PEDro scores. Every PT should know how to use this resource for evidence-based practice. Cochrane RoB tool is used for Cochrane reviews; QUADAS for diagnostic accuracy studies.

ETHICS

39. The principle of 'non-abandonment' in PT practice means:

A. PTs must treat all patients regardless of payment status

B. Once a therapeutic relationship is established, the PT must not abruptly end care without ensuring appropriate transition — providing notice, referral, and continuity of care

C. PTs cannot refuse to treat patients under any circumstances

D. PTs must work extra hours to avoid leaving patients without care

✓ **Answer: B**

💡 **Rationale & Explanation:**

Non-abandonment: once a PT-patient therapeutic relationship is established, the PT has a professional obligation NOT to abruptly discontinue care in a way that HARMS the patient. Proper termination of care includes: ADEQUATE NOTICE (sufficient time for the patient to find another provider); REFERRAL to another qualified PT or provider; DOCUMENTATION of the reason for termination; ensuring CONTINUITY OF CARE. Legitimate reasons to end the relationship: patient no longer needs PT; patient chooses to stop; patient is abusive or threatening; irreconcilable conflict of values. NOT acceptable: abrupt abandonment mid-treatment without notice, especially if the patient's condition would deteriorate without continued care. This is both an ethical obligation and a potential legal liability.

├— HEALTHCARE ADMINISTRATION

40. 'Evidence-based practice' (EBP) in physical therapy is defined as the integration of:

A. The most recent textbook information only

B. Best available research evidence + clinical expertise + patient values and preferences

C. Randomized controlled trials only, regardless of patient presentation

D. Expert opinion and tradition in clinical practice

✓ Answer: B

💡 Rationale & Explanation:

Evidence-Based Practice (EBP) — Sackett's three-legged stool: 1) BEST AVAILABLE RESEARCH EVIDENCE (highest quality studies — systematic reviews, RCTs, but also lower-level evidence when higher-level is unavailable); 2) CLINICAL EXPERTISE (the PT's accumulated knowledge, experience, assessment skills, and clinical reasoning); 3) PATIENT VALUES AND PREFERENCES (patient's goals, values, cultural context, preferences — the patient is an ACTIVE PARTNER in decision-making). EBP is NOT 'cookbook medicine' — it requires integrating all three components. Research evidence informs but does not dictate — the PT

uses clinical judgment to apply evidence to the INDIVIDUAL patient. When high-quality evidence is absent, clinical expertise and patient values guide decisions. This framework is fundamental to Philippine PT professional practice.

├— PHILIPPINE PT LAW

41. Under PRC regulations, a PT 'Certificate of Registration' is different from a 'Professional Identification Card' (PIC) in that:

A. They are exactly the same document

B. The Certificate of Registration is a PERMANENT record of licensure; the PIC is a RENEWABLE identification card (every 3 years with CPE compliance) that is required for active practice

C. The Certificate of Registration expires every 3 years

D. The PIC is required only for hospital practice

✓ Answer: B

💡 Rationale & Explanation:

PRC registration documents: CERTIFICATE OF REGISTRATION: issued upon passing the board examination; a PERMANENT certificate establishing the licensee's registration number; displayed in the clinical setting. PROFESSIONAL IDENTIFICATION CARD (PIC): a WALLET-SIZE card that must be RENEWED every 3 years upon completion of required CPE units; serves as proof of CURRENT registration and compliance with continuing education requirements. Required to show upon request in professional settings. A Certificate of Registration without a current PIC means the licensee has not complied with CPE requirements — they may not be authorized to practice until the PIC is renewed. Both documents must be obtained and maintained by every RPT.

├— ETHICS

42. **The 'therapeutic relationship' in physical therapy is based on:**

A. An equal friendship between therapist and patient

B. A professional, bounded relationship characterized by trust, confidentiality, respect for autonomy, and a power differential that places ethical obligations on the PT

C. A purely financial transaction

D. Personal friendship that extends outside the clinical setting

✓ Answer: B

💡 **Rationale & Explanation:**

Therapeutic relationship characteristics: A PROFESSIONAL relationship — governed by ethical codes and legal standards, not personal friendship. KEY ELEMENTS: Trust (patient shares private information and submits to physical contact); Confidentiality (private information stays protected); Power differential (PT has expertise and authority — patient is in a vulnerable position); Boundaries (clear professional limits on the relationship); Patient-centeredness (the patient's wellbeing is the primary concern). The power differential creates ETHICAL OBLIGATIONS for the PT — they must not exploit the relationship for personal gain, sexual gratification, or financial advantage. Boundary violations: romantic relationships with current patients, accepting large financial gifts, socializing outside the clinic inappropriately. Maintaining boundaries protects patients AND the profession.

├— RESEARCH & EBP

43. **A 'cohort study' in PT research is:**

A. An experimental study where researchers randomize participants

B. An observational study that FOLLOWS a group of people over time to determine who develops a particular outcome and what factors predict it

C. A study comparing two different treatments simultaneously

D. A study of a single patient's case

✓ **Answer: B**

💡 **Rationale & Explanation:**

Cohort study: an OBSERVATIONAL (non-experimental) study design. A defined COHORT (group of people sharing a common characteristic) is followed forward in time (PROSPECTIVE) to observe outcomes. Or, existing data is analyzed backward (RETROSPECTIVE cohort). Example: follow 1000 PT patients for 10 years to see who develops chronic LBP and what baseline factors predict it. Uses: INCIDENCE studies (how often does something occur?); RISK FACTOR identification; Prognosis research. Position in evidence hierarchy: Below RCTs (no randomization — potential for confounding) but above case-control (follows forward rather than looking backward from outcome). Cohort studies provide LEVEL II evidence for prognosis and risk factor questions.

├— PROFESSIONAL PRACTICE

44. The 'clinical reasoning' process in PT involves:

A. Following a fixed algorithm for all patients

B. Integrating patient information (history, examination findings), evidence, clinical expertise, and patient values to form a diagnosis, prognosis, and plan of care — an iterative, reflective cognitive process

C. Applying the same treatment to all patients with the same diagnosis

D. Using only imaging findings for treatment decisions

✓ **Answer: B**

💡 **Rationale & Explanation:**

Clinical reasoning: the cognitive process by which PTs: COLLECT data (history, examination); INTERPRET findings (pattern recognition, hypothesis testing); FORM a working diagnosis (both PT diagnosis and differential); IDENTIFY prognosis (likely outcome with/without

treatment); PLAN intervention (evidence-based, patient-centred); EVALUATE response (reassessment, modify plan as needed). Models: HYPOTHETICO-DEDUCTIVE reasoning (generate hypotheses, test them — like a detective); PATTERN RECOGNITION (experienced clinicians recognize patterns rapidly — expert intuition); NARRATIVE reasoning (understanding the patient's story and experience of illness). REFLECTIVE PRACTICE: continuously reviewing and improving one's own reasoning. Clinical reasoning is the FOUNDATION of expert PT practice — not just knowing facts, but knowing how to use them.

├─ RESEARCH & EBP

45. 'Publication bias' in systematic reviews refers to:

A. Authors publishing only positive studies

B. The tendency for POSITIVE RESULTS to be MORE LIKELY TO BE PUBLISHED than negative or null results — leading to an overestimate of treatment effects in meta-analyses

C. Bias against publishing Filipino researchers' work

D. Bias toward publishing longer studies

✓ Answer: B

💡 **Rationale & Explanation:**

Publication bias: a systematic bias in the research literature where studies with STATISTICALLY SIGNIFICANT (positive) results are more likely to be: submitted for publication, accepted by journals, and cited by other researchers. Studies with NULL or NEGATIVE results often remain unpublished ('file drawer problem'). Consequences for systematic reviews and meta-analyses: published literature OVERESTIMATES treatment effects; interventions appear more effective than they truly are. Detection: FUNNEL PLOT analysis (asymmetric funnel = possible publication bias); Egger's test; searching grey literature (unpublished theses, conference abstracts). In PT: this is why single positive studies should be viewed cautiously; systematic reviews with comprehensive search strategies (including grey

literature) are more reliable than those searching only major databases.

ETHICS

46. A patient asks the PT for their opinion on whether they should undergo surgery. The MOST appropriate PT response is:

A. Strongly recommend or strongly advise against surgery

B. Provide objective information about the PT findings, explain what is known about conservative vs. surgical outcomes in the literature, and recommend the patient discuss this with their surgeon — respecting the patient's autonomy and maintaining scope of practice

C. Refuse to discuss it at all

D. Make the decision for the patient based on the PT assessment

✓ Answer: B

💡 **Rationale & Explanation:**

PT scope of practice and surgical decisions: Surgery is a PHYSICIAN's domain. The appropriate PT response: PROVIDE INFORMATION (share PT findings: range of motion, strength, functional limitations, response to conservative treatment); EVIDENCE SUMMARY (what does the evidence show about conservative vs. surgical outcomes for this condition?); ENCOURAGE informed discussion with the SURGEON; RESPECT PATIENT AUTONOMY (ultimately the patient's decision). What NOT to do: make the surgical decision yourself (scope violation); give a personal recommendation for or against surgery (medical decision); scare or pressure the patient either way. This demonstrates: appropriate scope boundaries, evidence-based information sharing, and respect for the patient's right to make their own informed medical decisions.

HEALTHCARE ADMINISTRATION

47. The 'Donabedian model' for healthcare quality assessment evaluates quality through:

A. Patient satisfaction surveys only

B. Three dimensions: STRUCTURE (what resources are available), PROCESS (what is done), and OUTCOMES (what results are achieved)

C. Financial performance only

D. Staff credentials only

✓ Answer: B

💡 **Rationale & Explanation:**

Donabedian model: the framework for evaluating healthcare quality. STRUCTURE: the inputs to the healthcare system — facilities, equipment, staffing (number and qualifications of PTs), organizational policies, and resources. Are the right resources in place? PROCESS: the activities performed — PT assessment quality, treatment appropriateness, adherence to guidelines, communication, documentation. Is care delivered correctly? OUTCOMES: the results for patients — ROM improvement, pain reduction, functional gains, patient satisfaction, return to work/sport, quality of life. Did patients get better? In PT quality improvement: all three must be assessed. Good structure + good process → should lead to good outcomes. Poor outcomes despite good structure = process problem. This model is used in hospital accreditation (PhilHealth, JCI) and PT department quality assurance programs.

├— RESEARCH & EBP

48. The 'Hawthorne effect' in clinical research refers to:

A. A positive drug effect named after Dr. Hawthorne

B. Participants changing their behavior BECAUSE they know they are being OBSERVED — not because of the treatment itself

C. A bias in sample selection

D. The placebo effect of sham ultrasound

✓ **Answer: B**

💡 **Rationale & Explanation:**

Hawthorne effect (named after Hawthorne Works factory studies): participants in a study MODIFY their behavior simply because they are being OBSERVED and know they are participating in research — regardless of the specific intervention. In PT research: patients in a 'treatment group' may exercise more, comply better with home exercise programs, and report better outcomes partly because they feel special attention is being paid to them (not just because of the treatment). This inflates treatment effects. Blinding (patient doesn't know which treatment they receive) reduces the Hawthorne effect. In clinical practice: this also works therapeutically (therapeutic alliance, close monitoring by the PT can motivate patients) — but should not be confused with the specific effect of the intervention being studied.

├— PROFESSIONAL PRACTICE

49. The 'Clinical Practice Guideline' (CPG) differs from a 'textbook' in that:

A. Textbooks are more evidence-based

B. CPGs are systematically developed, evidence-based recommendations for specific clinical conditions (developed by expert panels reviewing current research) — updated regularly to reflect new evidence

C. CPGs are older and less reliable

D. CPGs are only for physicians

✓ **Answer: B**

💡 **Rationale & Explanation:**

Clinical Practice Guidelines (CPGs): systematically developed statements to GUIDE PRACTITIONER DECISIONS about appropriate care for specific clinical circumstances. Development: expert panel + SYSTEMATIC REVIEW of evidence + consensus process + GRADE

recommendations (A = strong, B = moderate, C = weak evidence). Examples: NICE guidelines (UK), APTA clinical practice guidelines (LBP, shoulder, knee OA, cervical pain), Philippine Physical Therapy Association guidelines. ADVANTAGES over textbooks: regularly UPDATED (textbooks may be 5-10 years old); SPECIFIC RECOMMENDATIONS for clinical decisions; GRADED by evidence quality; widely adopted as standards of care. CPGs are the APPLICATION of systematic reviews to clinical decision-making. PTs should know the major CPGs for conditions they commonly treat.

ETHICS

50. A PT working in a busy Philippine public hospital is asked to treat 20 patients per day with only 10 minutes per patient. The PT believes this is insufficient for safe, quality care. The appropriate professional response is:

A. Accept the workload without question to avoid conflict

B. Document the concern, discuss with supervisors/management citing patient safety and ethical obligations, advocate for appropriate staffing ratios and PT resources

C. Treat fewer patients by arriving late each day

D. Refuse to work entirely

✓ Answer: B

💡 Rationale & Explanation:

Workload and quality of care ethics: PTs have an ETHICAL OBLIGATION to provide SAFE and QUALITY care. When workloads compromise this, the PT must: 1) DOCUMENT concerns formally (creates an institutional record); 2) COMMUNICATE with management (discuss patient safety implications, cite evidence on minimum PT contact time for specific conditions, reference the PT code of ethics); 3) ADVOCATE through professional organizations (PAPT, PBPT) for appropriate staffing standards; 4) Consider reporting to regulatory bodies if patient safety is genuinely compromised. This is NOT about refusing to work — it's

about PROFESSIONAL ADVOCACY through appropriate channels. The PT who silently accepts unsafe conditions is also ethically compromised. Filipino PTs working in understaffed public facilities have a professional and ethical duty to advocate for their patients.

├— RESEARCH & EBP

51. 'Number Needed to Harm' (NNH) in clinical research represents:

A. The number of patients who improve with treatment

B. The number of patients who must receive the treatment for ONE patient to experience a HARM that would not have occurred with the control treatment

C. The number of treatment sessions needed

D. The side effect frequency

✓ Answer: B

💡 **Rationale & Explanation:**

NNH (Number Needed to Harm) = 1 / Absolute Risk Increase (ARI). It represents the 'flip side' of NNT. NNH = 5 means: for every 5 patients receiving the treatment, ONE experiences a HARM compared to the control group. CLINICAL DECISION-MAKING: Compare NNT vs. NNH: if NNT = 3 (3 patients treated for 1 benefit) and NNH = 20 (20 patients treated for 1 harm), the treatment is beneficial — more patients benefit than are harmed. If NNT = 20 and NNH = 3, the treatment does more harm than good. Ideal: LOW NNT (few patients needed to produce benefit) and HIGH NNH (many patients needed before causing harm). This framework is essential for evidence-based shared decision-making with patients about treatment options.

├— PROFESSIONAL PRACTICE

52. The 'Philippine Genome Center' recommendation that genetic information be kept private is relevant to PT practice in that:

A. Genetics are not relevant to PT

B. Genetic predispositions (e.g., connective tissue disorders, muscular dystrophies) may be discovered during PT assessment — this information must be treated with strict CONFIDENTIALITY under the Data Privacy Act (RA 10173)

C. Genetic tests are routinely done in PT

D. Genetic information is public domain

✓ Answer: B

💡 **Rationale & Explanation:**

Genetic information and PT practice: while PTs do not order genetic tests, patients may DISCLOSE genetic conditions (Marfan syndrome, Ehlers-Danlos syndrome, BRCA status, Huntington's disease) that are relevant to PT assessment and treatment planning. Key obligations: CONFIDENTIALITY (genetic information is highly sensitive — strict protection under RA 10173 Data Privacy Act); INFORMED USE (use genetic information only for clinically relevant PT planning); NO DISCRIMINATION (treatment should not be prejudiced by genetic status); REFERRAL (if genetic concerns emerge, refer to appropriate medical specialists). Example: a patient with suspected Marfan syndrome (joint hypermobility, tall stature, aortic root dilation) — relevant to exercise prescription (avoid high-intensity contact sports) but the genetic information must be handled with utmost care.

ETHICS

53. 'Telehealth PT' (remote physiotherapy via video) in the Philippines raises which PRIMARY ethical concern?

A. Internet speed limitations only

B. Maintaining STANDARDS OF CARE (ability to perform physical assessment, provide hands-on treatment), ensuring patient PRIVACY

AND DATA SECURITY (RA 10173 compliance), and verifying LICENSURE jurisdiction requirements

C. Patients prefer in-person PT always

D. Telehealth is illegal in the Philippines

✓ Answer: B

💡 **Rationale & Explanation:**

Telehealth PT ethical considerations: STANDARDS OF CARE: Can the PT adequately assess the patient remotely? Many conditions require physical examination that cannot be replicated via video. What treatments can be safely delivered remotely? When should the patient be seen in person? PRIVACY: Video platforms must be HIPAA/RA 10173 compliant — use encrypted platforms; obtain explicit consent for video recording if used; ensure patients are in a private location. LICENSURE: PTs should practice in jurisdictions where they are licensed; treating patients in other regions may require licensure there. EMERGENCY: What is the protocol if a patient has a medical emergency during a telehealth session? DOCUMENTATION: Remote sessions must be documented identically to in-person sessions. Telehealth PT expanded significantly during COVID-19; the PAPT and PRC issued guidelines for telehealth PT practice in the Philippines.

├─ RESEARCH & EBP

54. A 'p-value of 0.03' in a PT clinical trial means:

A. The treatment has a 3% chance of working

B. There is a 3% probability of observing a result AS EXTREME OR MORE EXTREME than the one found IF the null hypothesis were true — conventionally interpreted as 'statistically significant' (p<0.05)

C. The treatment is 97% effective

D. The study is 3% reliable

✓ Answer: B

💡 **Rationale & Explanation:**

P-value interpretation: the p-value is the probability of obtaining the observed results (or more extreme results) PURELY BY CHANCE, assuming the NULL HYPOTHESIS IS TRUE. p = 0.03 = 3% probability that these results are due to chance alone → we REJECT the null hypothesis at the conventional α = 0.05 threshold → 'statistically significant.' CRITICAL CAVEATS: Statistical significance ≠ clinical significance; a p<0.05 result may be a very small, clinically unimportant difference if the sample size is large; the p-value does NOT tell you the SIZE of the effect (use effect size, confidence intervals, and MCID for clinical relevance); the p-value does NOT tell you the PROBABILITY THAT THE NULL HYPOTHESIS IS TRUE. Modern statistics increasingly emphasizes effect sizes, confidence intervals, and clinical meaningfulness over p-values alone.

├— HEALTHCARE ADMINISTRATION

55. The 'triage' function in a PT outpatient department involves:

A. Treating the most complex patients first

B. Systematically PRIORITIZING patients based on clinical urgency — identifying those who need IMMEDIATE referral (red flags), urgent PT, or can wait — to ensure the most critical patients are seen first

C. Randomly assigning patients to therapists

D. Scheduling patients alphabetically

✓ Answer: B

💡 Rationale & Explanation:

PT triage: the process of systematically screening patients to determine URGENCY and appropriate NEXT STEP. Categories: URGENT/EMERGENT: immediate physician referral (red flags — new neurological symptoms, cauda equina signs, fracture not yet seen by physician, DVT, septic arthritis, cardiac symptoms during session — STOP and refer NOW); SEMI-URGENT: seen within 24-48 hours (acute injury with significant swelling, post-surgical complication, acute neurological change); ROUTINE: standard PT appointment (chronic

conditions, non-urgent musculoskeletal). The PT TRIAGE role (in some healthcare systems): a senior PT screens incoming patients or emergency department referrals to determine if PT management is appropriate or if medical consultation is needed first. Requires advanced clinical skills and knowledge of red flags.

PROFESSIONAL PRACTICE

56. Under the Philippine Magna Carta for Disabled Persons (RA 7277 and RA 10524), PT services for persons with disability:

A. Are not covered by any Philippine law

B. Should be accessible; employers must provide reasonable accommodation; government must support rehabilitation services; discrimination in access to healthcare services for PWDs is prohibited

C. Are purely voluntary charitable services

D. Are only available in tertiary hospitals

✓ Answer: B

💡 **Rationale & Explanation:**

Philippine disability rights laws relevant to PT: RA 7277 (Magna Carta for Disabled Persons, 1992): prohibits discrimination against PWDs in employment, education, and services; mandates accessibility (physical barriers removal); requires rehabilitation services in government health facilities; equal opportunities for PWDs in all sectors. RA 10524 (2013 amendment): strengthens employment provisions for PWDs. IMPLICATIONS FOR PT: treat all patients with disability with equal dignity and quality of care; advocate for accessible PT facilities (ramps, wide doors, accessible equipment); support community-based rehabilitation (CBR) programs; know assistive technology options; participate in advocacy for PWD rights. Filipino PTs are uniquely positioned as health professionals to advocate for the rights and needs of persons with disability in the community.

├— RESEARCH & EBP

57. The difference between 'efficacy' and 'effectiveness' in clinical research is:

A. They are the same concept

B. EFFICACY: does the treatment work under IDEAL, CONTROLLED conditions (RCT setting)? EFFECTIVENESS: does the treatment work in REAL-WORLD CLINICAL PRACTICE with all its variability?

C. Efficacy is always higher than effectiveness

D. Effectiveness studies use randomization, efficacy studies do not

✓ Answer: B

💡 Rationale & Explanation:

EFFICACY vs. EFFECTIVENESS: EFFICACY: measured in EXPLANATORY trials (RCTs) under highly controlled conditions — carefully selected patients, protocol adherence monitored, blinded assessors, ideal setting. Answers: 'Can this treatment work?' EFFECTIVENESS: measured in PRAGMATIC trials — in real clinical settings, with diverse patients (including those normally excluded from RCTs), usual care delivery, flexible protocols. Answers: 'Does this treatment work in practice?' Why the gap? Patients in RCTs are often younger, healthier, more motivated, less comorbid than real-world patients. PT delivered in an RCT may be more intensive and controlled than in a busy clinic. Effectiveness is usually LOWER than efficacy. This is why systematic reviews may overestimate real-world treatment effects. Both types of evidence are important for PT decision-making.

├— ETHICS

58. 'Moral distress' in physical therapy practice refers to:

A. The stress of working with difficult patients

B. Knowing the RIGHT THING TO DO ethically but being CONSTRAINED from doing it by institutional, systemic, or resource barriers

C. Normal clinical decision-making stress

D. Difficulty making diagnostic decisions

✓ Answer: B

💡 **Rationale & Explanation:**

Moral distress: first described by nurse ethicist Andrew Jameton. Occurs when the PT knows the ethically correct action but is PREVENTED from taking it due to: institutional policies (discharging patients prematurely for financial reasons), resource constraints (unable to provide adequate PT due to staffing), authority (a senior physician makes a decision the PT believes is harmful), or systemic barriers (lack of accessible PT for poor patients). Effects on the PT: frustration, burnout, compassion fatigue, job dissatisfaction, moral residue (cumulative moral injuries). Management: ethical consultations, peer support, reflective practice, advocacy through appropriate channels, institutional ethics committees. Recognizing moral distress is important for PT well-being and for maintaining ethical professional practice in challenging Philippine healthcare settings.

├— PROFESSIONAL PRACTICE

59. A physical therapist suspects a patient is a victim of domestic violence (DV). The appropriate response is:

A. Ignore it — it's outside the PT scope

B. Screen sensitively (using validated tools if available), document objectively, provide information about available resources, follow mandatory reporting laws if applicable, and ensure patient safety — without pressuring the patient

C. Confront the suspected abuser directly

D. Report to police without informing the patient

✓ **Answer: B**

💡 **Rationale & Explanation:**

DV response in PT practice: PTs are in a unique position — regular physical contact and rehabilitation relationship allow identification of patterns suggesting DV (unexplained injuries, inconsistent histories, fear, partner controlling communication). Appropriate PT response: SENSITIVE SCREENING (validated tools: HITS, WAST); BELIEVE the patient; DOCUMENT objectively (injuries, statements in quotation marks); PROVIDE RESOURCES (hotline numbers, shelters — without pressuring); SAFETY ASSESSMENT (immediate danger?); MANDATORY REPORTING: in the Philippines, Republic Act 9262 (Violence Against Women and Children Act) creates reporting obligations for healthcare providers who encounter VAWC victims — know your legal obligations; SAFETY PLAN: help the patient think through safety options. Never: confront the abuser, give information to the partner, or rush the patient to a decision they're not ready to make.

├— HEALTHCARE ADMINISTRATION

60. **'Case management' in PT refers to:**

A. One PT treating only one patient per day

B. A collaborative process of assessment, planning, facilitation, care coordination, evaluation, and advocacy to meet a patient's comprehensive health needs — ensuring continuity and coordination across providers

C. A billing process only

D. Patient self-management only

✓ **Answer: B**

💡 **Rationale & Explanation:**

PT case management: for patients with complex, multi-faceted needs (multiple comorbidities, social issues, need for multiple services), PT may function as case manager or collaborate with one. Functions:

ASSESSMENT of comprehensive needs (medical, functional, social, psychological, vocational); CARE PLANNING with the patient and team; COORDINATION of services (PT, OT, SLP, social work, home health, community services); ADVOCACY for the patient (ensuring they get needed services, navigating the health system); MONITORING progress; EVALUATION of outcomes. Important in: post-surgical complex cases, SCI rehabilitation, stroke, TBI, complex chronic conditions. In the Philippine healthcare setting: PT case management is particularly important in public hospitals where patients may have limited resources and navigate complex multi-level care needs. Strong inter-professional collaboration skills are essential.

├— PHILIPPINE PT LAW

61. The Philippine Board of Physical Therapy (PBPT) has how many members?

A. 3 members

B. 5 members — a chairman and 4 regular members, all appointed by the President of the Philippines upon recommendation of the PRC and PAPT

C. 7 members

D. 10 members

✓ Answer: B

💡 **Rationale & Explanation:**

PBPT composition under RA 10210: The Philippine Board of Physical Therapy consists of FIVE (5) MEMBERS: 1 CHAIRMAN and 4 REGULAR MEMBERS, all appointed by the PRESIDENT OF THE PHILIPPINES upon recommendation of the PRC (Professional Regulation Commission), with the support of the accredited professional organization of PTs (PAPT). Qualifications: Filipino citizen, good moral character, registered PT with at least 10 years of practice, not an officer of any school or university offering PT programs (to prevent conflicts of interest). Term: 3 years, with staggered terms to ensure continuity. The PBPT

administers the PT licensure examination, prepares the board exam questions, and enforces RA 10210. This governance structure is similar to other PRC-regulated professions in the Philippines.

ETHICS

62. In the Philippine PT Code of Ethics, the PRIMARY obligation of a PT is to:

A. Earn revenue for the healthcare facility

B. PROMOTE AND SAFEGUARD THE WELFARE, HEALTH, AND SAFETY OF PATIENTS AND THE GENERAL PUBLIC — all other professional obligations are subordinate to this primary duty to the patient

C. Follow all employer instructions without question

D. Advance the personal interests of the PT

✓ Answer: B

💡 **Rationale & Explanation:**

PT primary ethical obligation: The Philippine Physical Therapy Code of Ethics (and the WCPT/World Physiotherapy Code) places the PATIENT'S WELFARE as the primary obligation — above financial, institutional, or personal interests. This means: when there is a conflict between what the employer wants and what is best for the patient, the PT's obligation to the PATIENT takes precedence (within legal limits); PTs must prioritize patient safety over convenience, cost-cutting, or institutional preference; a PT who consistently treats patients poorly because of time or financial pressures is violating the primary ethical obligation. This patient-first principle is the foundational value from which all other ethical rules (beneficence, non-maleficence, justice, autonomy) derive.

RESEARCH & EBP

63. A 'randomized crossover trial' design means:

A. Two separate groups receive two different treatments

B. THE SAME GROUP receives BOTH treatments in SEQUENCE, with a WASHOUT PERIOD between — each participant is their own control

C. Randomization is not used

D. Crossover occurs in the middle of treatment

✓ Answer: B

💡 **Rationale & Explanation:**

Crossover trial: each participant receives BOTH interventions (treatment A and treatment B) in a random order, separated by a WASHOUT PERIOD (to allow the first treatment's effects to dissipate before the second treatment begins). Advantages: 1) Each participant is their OWN CONTROL — individual differences are eliminated from the comparison; 2) Requires FEWER PARTICIPANTS than parallel group trials; 3) Higher statistical power. Disadvantages: 1) CARRYOVER effects (first treatment's effect persists into the second period despite washout); 2) Not appropriate for irreversible treatments (surgery); 3) Requires longer study duration. In PT research: crossover designs are used for acute effect studies (single session comparisons) or when stable chronic conditions allow repeated assessment. Important to identify when critically appraising PT research — a crossover with inadequate washout has significant bias risk.

├— PROFESSIONAL PRACTICE

64. The 'scope of practice' of a PT CLINICAL SPECIALIST in the Philippines under RA 10210 includes:

A. Prescribing specialist medications

B. Advanced clinical examination, diagnosis, and treatment in their specialty area (e.g., musculoskeletal, neuro, cardiopulmonary, sports, pelvic floor) beyond the basic PT scope — with additional post-graduate training and possibly specialty certification

C. Performing surgery in their specialty area

D. Managing hospital administration exclusively

✓ **Answer: B**

💡 **Rationale & Explanation:**

PT Specialization in the Philippines: While RA 10210 defines the general scope of PT, there is a growing recognition of PT SPECIALIZATION within the profession. Organizations like PAPT have special interest groups (musculoskeletal, neuro, cardiopulmonary, sports, pediatric, geriatric, women's health). A PT specialist: 1) Undergoes ADVANCED POST-GRADUATE TRAINING (fellowship, residency, or specialty courses) in a specific area; 2) Develops advanced clinical reasoning and technical skills beyond the general PT scope; 3) May seek specialty CERTIFICATION (some through international bodies like APTA Board Certification, AAOMPT for manual therapy); 4) Does NOT acquire the right to prescribe medications, perform surgery, or practice medicine — scope boundaries remain; 5) Practices at an advanced level WITHIN the defined PT scope. Philippine PT specialization is a developing area aligned with global trends.

├─ RESEARCH & EBP

65. 'Ecological validity' in PT research refers to:

A. Whether the study results are statistically valid

B. Whether the study FINDINGS CAN BE GENERALIZED TO REAL-WORLD CLINICAL PRACTICE — are the patients, settings, therapists, and treatments in the study representative of actual clinical conditions?

C. Whether the study used large sample sizes

D. Whether the measurement tools were accurate

✓ **Answer: B**

💡 **Rationale & Explanation:**

Ecological validity: a type of EXTERNAL VALIDITY — the degree to which research findings apply to real-world settings and populations. A study with HIGH ECOLOGICAL VALIDITY: uses patients representative of the actual clinical population (including comorbidities, age range, severity spectrum); conducted in realistic clinical settings; treatments delivered by typical clinicians (not just research specialists); outcomes reflect real-world function. Many high-quality RCTs have LOW ecological validity: highly selected patients (exclude common comorbidities), ideal treatment conditions, unusually skilled therapists. This explains the EFFICACY-EFFECTIVENESS GAP: treatments that work brilliantly in controlled trials may perform less well in messy real-world practice. In Philippine PT: ecological validity is particularly important — international studies from high-income countries may not directly apply to the Philippine healthcare context (resource constraints, cultural factors, health literacy).

ETHICS

66. The 'principle of double effect' in medical ethics states:

A. Two positive outcomes are required for ethical treatment

B. It is SOMETIMES ethically permissible to cause harm as a FORESEEN but UNINTENDED SIDE EFFECT of achieving a GREATER GOOD — if the action is not intrinsically wrong, the intent is good, the harm is not the means to the good, and the good outweighs the harm

C. Always avoid any possible harm

D. The patient must be informed of all effects

✓ Answer: B

💡 Rationale & Explanation:

Principle of double effect (PDE): a classical ethics principle with four conditions that must ALL be met: 1) The ACTION itself is not intrinsically wrong (giving a therapeutic exercise that may cause some pain is not inherently wrong); 2) The INTENT is good (the PT intends to help the patient); 3) The HARM is a FORESEEN but UNINTENDED side

effect (pain is foreseen but not the goal); 4) The GOOD achieved OUTWEIGHS the harm. Example in PT: performing aggressive joint mobilization that will cause temporary significant pain to achieve much greater long-term functional benefit — can be justified under PDE IF all four conditions are met and the patient has given informed consent. NOT applicable as a justification for causing harm when less harmful alternatives exist. Important in end-of-life care, palliative PT, and high-risk interventions.

├— HEALTHCARE ADMINISTRATION

67. 'Clinical governance' in a Philippine PT department refers to:

A. Managing the financial accounts of the department

B. A FRAMEWORK by which healthcare organizations are accountable for continuously improving the quality of their services and safeguarding high standards of care — including clinical audit, risk management, evidence-based practice, education, and patient safety

C. Staff scheduling only

D. Medical record storage

✓ Answer: B

💡 **Rationale & Explanation:**

Clinical governance: the systematic approach to maintaining and improving the QUALITY AND SAFETY of clinical care. Components: 1) CLINICAL AUDIT: systematic review of clinical practice against standards (are PTs documenting properly? following guidelines?); 2) RISK MANAGEMENT: identifying, assessing, and reducing clinical risks (falls prevention, infection control); 3) EVIDENCE-BASED PRACTICE: ensuring clinical decisions are informed by current best evidence; 4) EDUCATION AND TRAINING: maintaining PT competence (CPE); 5) PATIENT AND PUBLIC INVOLVEMENT: patient feedback, patient satisfaction surveys; 6) INFORMATION MANAGEMENT: accurate records, outcome data collection; 7) STAFFING AND STAFF MANAGEMENT: adequate staffing ratios. In the Philippine context:

PhilHealth accreditation, hospital licensing, and DOH requirements all have clinical governance components that PT departments must satisfy.

├─ RESEARCH & EBP

68. The 'GRADE approach' (Grading of Recommendations, Assessment, Development, and Evaluations) in clinical guidelines rates:

A. Only the quality of individual RCTs

B. BOTH the QUALITY OF EVIDENCE (high, moderate, low, very low) AND the STRENGTH OF RECOMMENDATIONS (strong or conditional/weak) — used in clinical practice guideline development

C. Only systematic reviews

D. Patient preferences

✓ Answer: B

💡 **Rationale & Explanation:**

GRADE approach in clinical guidelines: EVIDENCE QUALITY: HIGH = further research very unlikely to change our confidence in the effect estimate; MODERATE = further research likely to have important impact; LOW = further research very likely to have important impact; VERY LOW = very uncertain about the estimate. STRENGTH OF RECOMMENDATION: STRONG ('we recommend') = desirable effects clearly outweigh undesirable effects; CONDITIONAL/WEAK ('we suggest') = effects are closely balanced or uncertain. Example: 'We strongly recommend exercise therapy for chronic LBP (moderate quality evidence).' GRADE is now the standard for clinical practice guideline development globally — used in Cochrane reviews, WHO guidelines, NICE, APTA CPGs. PT practitioners should understand GRADE-based recommendations when reading CPGs to interpret how confident they can be in the recommendation.

├— PROFESSIONAL PRACTICE

69. Under Philippine law, the 'medical record' of a patient is owned by:

A. The patient

B. THE HEALTHCARE INSTITUTION (hospital, clinic) — but the patient has the RIGHT OF ACCESS to their own medical records

C. The treating physician

D. The insurance company

✓ Answer: B

💡 Rationale & Explanation:

Medical record ownership in the Philippines: under DOH regulations and the Data Privacy Act (RA 10173): the PHYSICAL RECORD is the property of the HEALTHCARE INSTITUTION that created it. However, the PATIENT has the RIGHT TO ACCESS, REQUEST COPIES, and REVIEW their own records. Institutions must: maintain records for a minimum period (typically 10 years for adults, longer for minors); respond to patient record requests within a reasonable timeframe; protect records from unauthorized access (RA 10173 — Data Privacy Act). PT implications: PT documentation (progress notes, evaluation reports) forms part of the official medical record — it belongs to the institution; the PT has professional and legal accountability for the accuracy and completeness of their documentation; records must be retained per DOH/institutional policy; patients requesting PT evaluation reports must be accommodated.

├— ETHICS

70. 'Professional boundaries' in PT include appropriate management of which scenario?

A. A patient sending a holiday greeting card

B. A patient offering a large gift of substantial monetary value for 'extra care' beyond what other patients receive — the PT should DECLINE politely and explain that all patients receive equitable care

C. A patient recommending the PT to family members

D. A patient asking about the PT's professional background

✓ Answer: B

💡 **Rationale & Explanation:**

Professional boundary violation — gifts: a SMALL token gift (fruit, small food item, greeting card) from a patient is generally acceptable culturally in the Philippines and does not compromise the therapeutic relationship. However, a SIGNIFICANT MONETARY GIFT creates problems: 1) UNDUE INFLUENCE: the patient may feel obligated or may expect preferential treatment; 2) EXPLOITATION: the power differential (patient is vulnerable, PT has authority) makes large gifts ethically problematic; 3) EQUITY: if one patient gives gifts for 'extra care,' other patients who can't afford gifts are disadvantaged. PT response: thank the patient, explain that you provide excellent care to all patients equally as a professional standard, and politely decline gifts beyond token cultural courtesies. Document the interaction if there is pressure or expectations attached to the gift offer.

├— RESEARCH & EBP

71. The 'Delphi method' in PT research is used when:

A. A randomized controlled trial is needed

B. EXPERT CONSENSUS is needed on topics where direct experimentation is difficult — using iterative rounds of anonymous questionnaires to reach consensus among experts on clinical guidelines, best practices, or taxonomies

C. A case study is appropriate

D. A meta-analysis is conducted

✓ Answer: B

💡 **Rationale & Explanation:**

Delphi method: a structured communication process for reaching EXPERT CONSENSUS. Process: 1) A panel of experts is identified; 2) ROUND 1: experts anonymously respond to open-ended questions; 3) Responses are collated, summarized, and returned to the panel; 4) ROUND 2+: experts rate their agreement with statements (usually on a 1-9 Likert scale) and revise opinions if persuaded by the group; 5) Consensus is reached when >75-80% of experts agree on a statement. Uses in PT: developing clinical practice guidelines when RCT evidence is absent; defining the scope of PT subspecialties; creating standardized terminology; establishing outcome measure batteries for specific conditions. Advantages: anonymity reduces social pressure; iterative rounds improve consensus; geographically dispersed experts can participate. Limitations: consensus ≠ truth; subject to framing bias.

HEALTHCARE ADMINISTRATION

72. The 'minimum data set' for PT documentation in a Philippine hospital (per standard documentation principles) includes:

A. Name and diagnosis only

B. PATIENT IDENTIFICATION, DATE AND TIME, PROBLEM/DIAGNOSIS, GOALS (short and long term), TREATMENT PROVIDED, PATIENT RESPONSE, REASSESSMENT FINDINGS, AND PT SIGNATURE WITH LICENSE NUMBER

C. Medical history only

D. Billing codes only

✓ **Answer: B**

💡 **Rationale & Explanation:**

Minimum PT documentation elements: 1) PATIENT IDENTIFICATION (name, age, hospital number, ward); 2) DATE AND TIME of session; 3) PT DIAGNOSIS/PROBLEM LIST; 4) GOALS (STG = short-term, LTG = long-term — SMART format); 5) TREATMENT PROVIDED (modalities,

techniques, exercise, duration, parameters); 6) PATIENT RESPONSE (objective findings: ROM measurements, MMT grades, pain NRS, functional test results; AND subjective response: how did the patient feel?); 7) REASSESSMENT (comparison to previous findings, progress toward goals); 8) PLAN for next session or discharge; 9) PT SIGNATURE + PRINTED NAME + PROFESSIONAL IDENTIFICATION CARD NUMBER. The PIC number is legally required on official documents signed by a licensed PT. Incomplete documentation is a medicolegal risk and may affect insurance reimbursement.

├─ ETHICS

73. The concept of 'capacity' (decision-making capacity) in patient consent refers to:

A. Chronological age only

B. The patient's ABILITY to understand information relevant to their healthcare decision, appreciate the consequences, reason about options, and EXPRESS a choice — even patients with psychiatric conditions may retain capacity for specific decisions

C. Level of education

D. Native intelligence

✓ Answer: B

💡 **Rationale & Explanation:**

Decision-making capacity: different from COMPETENCE (a legal term determined by courts). Capacity is assessed by the CLINICIAN for the specific decision at hand. A patient has capacity if they can: 1) UNDERSTAND the relevant information about the decision (treatment, alternatives, risks, benefits); 2) APPRECIATE how the information applies to their own situation; 3) REASON AND WEIGH the options (compare alternatives, consider consequences); 4) EXPRESS a consistent choice. Capacity can be decision-specific: a patient may lack capacity for complex financial decisions but retain capacity for PT treatment consent. Capacity can fluctuate: a patient in delirium may

lack capacity today but regain it tomorrow. When capacity is lacking: use the patient's advance directive (if any), consult the legal surrogate (family, guardian), or seek ethics consultation. In PT: always respect capacity; assume capacity unless clear evidence of impairment.

RESEARCH & EBP

74. A 'case series' in PT research describes:

A. A single patient's case

B. A collection of CASE REPORTS documenting outcomes for a small group of patients (typically 3-20) with similar diagnoses treated with the same intervention — without a control group

C. A randomized trial

D. A systematic review of case reports

✓ Answer: B

💡 Rationale & Explanation:

Case series: collects and reports outcomes for a series of patients (typically 3-20 or more) with similar conditions receiving the same treatment — WITHOUT RANDOMIZATION or CONTROL GROUP. Evidence level: LOW (Level 4 in most hierarchies). Value: 1) Generates HYPOTHESES for future RCTs; 2) Describes outcomes for RARE CONDITIONS where RCTs are impractical; 3) Documents ADVERSE EVENTS or unexpected outcomes; 4) Describes patterns of clinical presentation. Limitations: no comparison group (can't conclude the treatment caused the improvement); selection bias; no blinding; results may not generalize. In PT: case series are common for newer interventions, rare conditions, and in lower-resourced settings where RCTs are not feasible. Valuable as early-stage evidence, but must be interpreted cautiously — correlation is not causation.

PROFESSIONAL PRACTICE

75. The 'PhilHealth Primary Care Benefit' (PCB) affects PT practice by:

A. Eliminating PT coverage entirely

B. Including PT services in the primary care package — PhilHealth-accredited PT clinics can provide covered services to PhilHealth members, improving accessibility of PT for LOWER-INCOME FILIPINOS

C. Providing unlimited PT sessions for all Filipinos

D. Covering PT for hospitalization only

✓ Answer: B

💡 **Rationale & Explanation:**

PhilHealth and PT coverage: The Philippine Health Insurance Corporation (PhilHealth) has expanded coverage over the years to include PT services. Under various packages: CASE RATE packages for specific conditions (stroke, TBI, SCI rehabilitation) include PT as a covered service; PRIMARY CARE BENEFIT: PhilHealth-accredited clinics (including those with PT services) can provide covered consultations and services to members. IMPLICATIONS for PT: PTs should ensure their practice is PROPERLY ACCREDITED with PhilHealth (institutional or individual accreditation); correct documentation and billing codes must be used; coverage helps bridge the gap between expensive PT and accessibility for lower-income patients; advocacy for expanded PhilHealth PT coverage is a PAPT priority. Understanding healthcare financing in the Philippines is part of the administrative knowledge expected of registered PTs.

ETHICS

76. The 'best interest standard' in healthcare decision-making for incapacitated patients means:

A. The family always decides for the patient

B. The decision-maker (surrogate/family/healthcare team) must choose the option that PROMOTES THE PATIENT'S WELLBEING, taking

into account their known values and preferences (if known), and objective medical benefit — not what is best for the family or institution

C. The most expensive treatment is always best

D. The least invasive treatment is always best

✓ Answer: B

💡 **Rationale & Explanation:**

Best interest standard: when a patient LACKS decision-making capacity AND has no advance directive, the surrogate decision-maker must apply the BEST INTEREST STANDARD: 1) What would PROMOTE THE PATIENT'S WELLBEING? 2) What DOES OR DID the patient VALUE? (even without a formal advance directive, family may know preferences) 3) What does the EVIDENCE say about likely outcomes of available options? 4) Balance QUALITY OF LIFE with QUANTITY OF LIFE considerations. The best interest standard is the ethical framework for PT decisions when: patients with severe TBI, severe stroke, or advanced dementia cannot consent. PT must be an advocate for the patient's best interests in the team — particularly if proposed treatments (aggressive stretching, painful procedures) are not in the patient's best interest given their prognosis.

├─ HEALTHCARE ADMINISTRATION

77. The 'PT-to-patient ratio' recommended in Philippine acute rehabilitation facilities is:

A. 1 PT : 20 patients

B. 1 PT : 6-8 patients (acute/subacute rehabilitation); 1 PT : 10-15 patients in general ward PT

C. 1 PT : 50 patients

D. No guidelines exist

✓ Answer: B

💡 **Rationale & Explanation:**

PT staffing ratios in the Philippines: the Department of Health (DOH) and professional guidelines provide recommended staffing ratios. For REHABILITATION UNITS: typically 1 PT per 6-8 patients for intensive inpatient rehabilitation. For GENERAL WARD PT SERVICES: 1 PT per 10-15 patients. For OUTPATIENT PT: depends on treatment complexity and duration — typically 3-6 patients per PT per half-day session. These ratios ensure: adequate time per patient for assessment, treatment, and documentation; patient safety during therapy sessions; compliance with professional standards. UNDERSTAFFING (as occurs in many Philippine public hospitals): creates ethical dilemmas, compromises care quality, and is a target for professional advocacy. PTs have both an ethical and professional obligation to advocate for appropriate staffing — and to document concerns when ratios are unsafe.

├— RESEARCH & EBP

78. The 'forest plot' in a meta-analysis displays:

A. Patient demographics

B. The EFFECT SIZE ESTIMATE and CONFIDENCE INTERVAL for each individual study AND the OVERALL POOLED EFFECT — allowing visual assessment of consistency (heterogeneity) across studies

C. Statistical significance only

D. Methodological quality scores

✓ Answer: B

💡 Rationale & Explanation:

Forest plot: the key graphical output of a meta-analysis. For each included study: a SQUARE (size proportional to the study's weight in the analysis) represents the point estimate (e.g., mean difference); horizontal lines represent the 95% CONFIDENCE INTERVAL. A DIAMOND at the bottom represents the POOLED OVERALL EFFECT (width = CI). A VERTICAL LINE at 'no effect' (0 for mean difference, 1.0 for risk ratios). If a study's CI CROSSES the null line = not statistically

significant for that study. If the pooled diamond CI crosses the null line = overall intervention not statistically significant. HETEROGENEITY: if the squares are scattered widely on both sides of the null = high heterogeneity (studies are inconsistent). I^2 statistic quantifies heterogeneity: <25% = low, 25-75% = moderate, >75% = high heterogeneity. High heterogeneity questions whether pooling was appropriate.

├— PROFESSIONAL PRACTICE

79. A PT in a Philippine rural health unit (RHU) has limited equipment. The MOST cost-effective intervention for musculoskeletal pain in this setting is:

A. Wait until proper equipment is available

B. EXERCISE THERAPY (prescribed and supervised) + PATIENT EDUCATION — the most evidence-based and widely recommended intervention for musculoskeletal pain, requiring no special equipment and proven effective across a wide range of conditions

C. Electrical modalities only

D. Manual therapy only

✓ Answer: B

💡 Rationale & Explanation:

Evidence-based PT in resource-limited settings: Exercise therapy + Patient education is: 1) THE MOST EVIDENCE-BASED intervention for most musculoskeletal conditions (chronic LBP, shoulder pain, hip/knee OA, neck pain); 2) REQUIRES NO SPECIAL EQUIPMENT — bodyweight exercises, resistance bands (low cost), home exercise programs; 3) EMPOWERS PATIENTS — builds self-management skills; 4) COST-EFFECTIVE — long-term outcomes are better than passive modality-dependent therapy; 5) FEASIBLE in rural Philippines. The Philippine healthcare context demands that PTs develop strong exercise prescription and patient education skills — these are the foundation of effective PT even without modalities. Modalities are ADJUNCTS;

exercise and education are the EVIDENCE-BASED CORE of most musculoskeletal PT interventions. A rural PT without electricity can still provide excellent PT through therapeutic exercise and education.

ETHICS

80. The 'sliding scale' of decision-making capacity means:

A. Patients can pay for different levels of care

B. MORE COMPLEX, HIGHER-RISK decisions require a HIGHER STANDARD of demonstrated capacity — a patient refusing a low-risk treatment needs to demonstrate less capacity than one refusing a life-saving procedure

C. Capacity is based on age

D. All decisions require the same level of capacity

✓ Answer: B

💡 **Rationale & Explanation:**

Sliding scale of capacity (Drane, Buchanan & Brock): the threshold for capacity assessment should match the RISK AND CONSEQUENCES of the decision. LOW-STAKES decision (e.g., choosing between two equally safe exercise options): patient needs only to demonstrate BASIC understanding and expressed preference. MODERATE-STAKES decision (e.g., declining a routine but important PT exercise due to fear): the PT should ensure the patient truly understands the consequences of refusal. HIGH-STAKES decision (e.g., refusing life-saving rehabilitation that would prevent permanent disability): the PT must be more rigorous in assessing whether the patient truly has the capacity to make this decision — and involve the medical team and ethics consultation if uncertain. The sliding scale protects PATIENT AUTONOMY for everyday decisions while ensuring PROTECTION for high-stakes, potentially irreversible decisions.

PROFESSIONAL PRACTICE

81. In documenting a PT EVALUATION (initial assessment), the document must include all EXCEPT:

A. Chief complaint and history

B. Objective findings (measurements, tests)

C. PT DIAGNOSIS and problem list

D. The patient's financial history and bank account details

✓ Answer: D

💡 Rationale & Explanation:

PT evaluation documentation requirements: A complete PT evaluation includes: SUBJECTIVE: chief complaint, history of present illness (HPI), past medical/surgical history, medications, social history, functional history, patient goals. OBJECTIVE: physical examination findings — vital signs, ROM (goniometric measurements), MMT grades, special tests, functional assessments, neurological exam. ASSESSMENT: PT DIAGNOSIS (not medical diagnosis — the PT's clinical judgment of the patient's movement dysfunction), problem list, impairments, activity limitations, participation restrictions (ICF framework). PLAN: goals (SMART), proposed interventions, frequency/duration of treatment, referrals. PT SIGNATURE + LICENSE NUMBER. Financial history and bank details are: 1) IRRELEVANT to the PT clinical assessment; 2) A PRIVACY VIOLATION if recorded without a legitimate clinical reason; 3) Not part of PT documentation standards. Know what belongs in PT documentation and what constitutes a privacy breach.

PHILIPPINE PT LAW

61. The examination for PT licensure in the Philippines covers how many subjects with what passing standard?

A. 3 subjects, 75% average

B. MULTIPLE SUBJECTS covering basic sciences, clinical sciences, and PT procedures — a general average of AT LEAST 75% is required with no individual subject score below 60% to pass the PT board examination

C. 2 subjects, 70% average

D. Any average above 50%

✓ Answer: B

💡 **Rationale & Explanation:**

PRC PT Licensure Examination: The Philippine PT board examination covers subjects including basic sciences (anatomy, physiology, kinesiology, pathology), clinical sciences (musculoskeletal, neurological, cardiopulmonary PT), PT procedures and modalities, and professional practice/ethics. PASSING STANDARD: General weighted average of AT LEAST 75%; No individual subject score below 60%. If a candidate achieves ≥75% average but scores <60% in any single subject: CONDITIONAL PASS — the subject(s) below 60% must be retaken. If the candidate fails the retake: FAILURE. All subjects at ≥60% but average <75%: FAILURE. A candidate who fails the board examination may retake it in subsequent examination periods. After 3 failures: additional requirements may be imposed by the PBPT. Knowing the passing standards is essential for candidate preparation.

ETHICS

62. The 'SOAP' note's 'Assessment' section reflects the PT's CLINICAL REASONING. Which of the following is an appropriate assessment statement?

A. Patient has back pain

B. Patient presents with lumbar segmental hypomobility at L4-L5 contributing to mechanical low back pain and activity limitations in prolonged sitting and stair climbing; progressing well toward goals

C. Patient needs more treatment

D. Doctor diagnosed lumbar disc herniation

✓ **Answer: B**

💡 **Rationale & Explanation:**

PT Assessment section — clinical reasoning documentation: The ASSESSMENT should contain the PT's professional interpretation, NOT a restatement of objective findings (that belongs in 'O') or the medical diagnosis (that's the physician's). Good assessment content: PT DIAGNOSIS (movement dysfunction pattern); PROBLEM LIST (functional limitations); PROGRESS TOWARD GOALS (are they improving, plateauing, regressing?); CLINICAL REASONING (why is the patient presenting this way, what is driving the problem?); PROGNOSIS (expected timeline for achieving goals). Example: 'Patient demonstrates continued improvement in lumbar segmental mobility; pain with prolonged sitting reduced from 7/10 to 4/10 since last week. Active in home exercise program compliance. Expected to achieve short-term goal of 30-minute sit tolerance within 2 sessions.' This documents PROGRESS, PT PROFESSIONAL JUDGMENT, and CLINICAL THINKING.

├─ RESEARCH & EBP

63. The 'ecological fallacy' in research refers to:

A. A statistical calculation error

B. Making INCORRECT INFERENCES about INDIVIDUALS based on AGGREGATE (GROUP-LEVEL) DATA — a common error when interpreting population statistics

C. Publication bias

D. A type of selection bias

✓ **Answer: B**

💡 **Rationale & Explanation:**

Ecological fallacy (Robinson, 1950): when correlations found at the GROUP LEVEL are incorrectly applied to INDIVIDUAL LEVEL

conclusions. Example: a study finds that countries with higher PT-to-population ratios have lower rates of chronic disability. INCORRECT inference: 'patients who receive PT have lower disability.' CORRECT recognition: this is group-level data — confounding factors (wealth, overall healthcare quality, diet, culture) may explain the correlation. The individual-level inference cannot be drawn from group-level data. In epidemiology and public health research: common in ecological studies (studies using population-level data). In PT research: aggregate outcome data from a rehabilitation center (average improvement in Barthel score) cannot be used to predict an INDIVIDUAL patient's outcome without individual-level data. Understanding this fallacy helps PTs critically appraise health policy and population-based research.

├— PROFESSIONAL PRACTICE

64. The 'Philippine Society of Physical Therapists' is:

A. The regulatory body for PTs

B. A historical name for the PAPT — the Philippine Association of Physical Therapists (PAPT) has been the primary professional organization of Philippine PTs since its founding in 1961, recognized as the organization representing PTs in professional and international matters

C. An academic institution

D. A government department

✓ Answer: B

💡 **Rationale & Explanation:**

PAPT history and mission: The PHILIPPINE ASSOCIATION OF PHYSICAL THERAPISTS (PAPT) was established in 1961, making it one of the oldest PT professional organizations in Southeast Asia. Previously known in some historical documents as the Philippine Society of Physical Therapists. PAPT's current structure includes: PAPT National (headquarters); Regional chapters; Special Interest Groups (Musculoskeletal, Neurological, Cardiopulmonary, Sports, Pediatric,

Women's Health, Geriatric PT). International membership: WORLD PHYSIOTHERAPY (formerly WCPT) — PAPT is the Philippine member organization. Activities: annual conventions, CPD programs, advocacy, PT education standards, scope of practice guidelines. PAPT membership is voluntary but strongly encouraged for all Filipino PTs — it provides CPD opportunities, professional networking, and collective advocacy for the profession.

├— RESEARCH & EBP

65. The 'standard deviation' (SD) in a research sample represents:

A. The sample size

B. The AVERAGE DISTANCE of individual data points FROM THE MEAN — measuring the SPREAD or VARIABILITY of the data within a group

C. The difference between two groups

D. The confidence interval

✓ Answer: B

💡 **Rationale & Explanation:**

Standard deviation (SD): the SD measures how spread out the data values are from the MEAN. CALCULATION: square root of the average of squared deviations from the mean. INTERPRETATION: SMALL SD = data points clustered closely around the mean (low variability). LARGE SD = data points widely spread from the mean (high variability). CLINICAL USE: SD helps interpret MCID (Minimal Clinically Important Difference) and effect sizes. EXAMPLE: if the mean FMA-UE improvement after rehabilitation is 15 points with SD = 5: 68% of patients improved between 10-20 points; 95% between 5-25 points. STANDARD ERROR (SE): SE = SD ÷ √n (describes variability of the MEAN, not individual data points). CONFIDENCE INTERVAL (CI): Mean ± 1.96 × SE = 95% CI. Understanding SD, SE, and CI is fundamental for interpreting PT research results and knowing whether an observed change is meaningful.

ETHICS

66. The ethical obligation of 'fidelity' in professional practice means:

A. Financial loyalty to employer

B. KEEPING COMMITMENTS AND PROMISES — arriving for scheduled sessions, following through on treatment plans, maintaining confidentiality as promised, and fulfilling professional obligations to patients, colleagues, and the profession

C. Working overtime

D. Treating all conditions equally

✓ Answer: B

💡 Rationale & Explanation:

Fidelity: the ethical principle of FAITHFULNESS to commitments and obligations. In PT practice: KEEPING SCHEDULED APPOINTMENTS (patients rely on PT sessions for their recovery); FOLLOWING THROUGH on treatment plans as promised; MAINTAINING CONFIDENTIALITY as promised at the start of care; FULFILLING PROFESSIONAL OBLIGATIONS to the team, institution, and profession; HONORING REFERRAL COMMITMENTS (if you refer a patient to a colleague, follow up). Violations of fidelity: cancelling sessions repeatedly without reason; abandoning care mid-treatment; failing to document as promised; breaking confidentiality promises. Fidelity builds TRUST — the foundation of the therapeutic relationship. In complex team settings: fidelity includes attending team meetings, completing assessments by agreed timelines, and completing documentation that other team members depend on for decision-making. The PT Code of Ethics in the Philippines reinforces fidelity as a core professional virtue.

RESEARCH & EBP

67. The 'PICO' framework for formulating clinical research questions stands for:

A. Protocol, Intervention, Comparison, Outcome

B. PATIENT/POPULATION, INTERVENTION, COMPARISON, OUTCOME — a structured approach to formulating answerable clinical questions that can be used to guide database searches and critical appraisal

C. Procedure, Investigation, Cause, Outcome

D. Pain, Improvement, Clinician, Objective

✓ Answer: B

💡 **Rationale & Explanation:**

PICO framework: P = PATIENT/POPULATION (who is the patient, what is their condition — e.g., 'adults with chronic non-specific LBP'); I = INTERVENTION (what treatment, exposure — e.g., 'manual therapy'); C = COMPARISON (what is the alternative — e.g., 'exercise therapy alone' or 'sham treatment'); O = OUTCOME (what are you measuring — e.g., 'pain reduction, functional improvement at 3 months'). FULL EXAMPLE: 'In adults with chronic non-specific LBP (P), does manual therapy combined with exercise (I) compared with exercise alone (C) produce greater pain reduction and functional improvement at 3 months (O)?' This PICO question then guides: database search terms; inclusion criteria for systematic review; assessment of whether an individual study answers the clinical question. PICO (or PICOS — S for Study Design) is the foundation of evidence-based practice. Teach PT students to construct PICO questions for every clinical decision.

├— PROFESSIONAL PRACTICE

68. Under Philippine law, the PT's obligation to maintain 'continuing competence' means:

A. Only attending the annual PAPT convention

B. Systematically updating clinical knowledge and skills through CPD, self-directed learning, peer consultation, and reflective practice —

ensuring that clinical practice remains current with the evolving evidence base throughout a professional career

C. Memorizing old textbooks

D. Only reading government documents

✓ **Answer: B**

💡 **Rationale & Explanation:**

Continuing competence: a broader concept than just meeting CPE requirements. True continuing competence involves: 1) FORMAL CPD: seminars, workshops, conferences (required for PRC license renewal — 45 CPE units/3 years); 2) INFORMAL LEARNING: reading journals, textbooks, clinical guidelines (APTA, PAPT, WHO); 3) REFLECTIVE PRACTICE: systematic review of one's own clinical outcomes and decision-making; 4) PEER CONSULTATION: discussing complex cases with colleagues; 5) SUPERVISED PRACTICE: seeking mentorship or supervision for new skills; 6) SELF-ASSESSMENT: identifying knowledge gaps and addressing them proactively. Why it matters: Evidence base for PT is constantly evolving — what was standard practice 10 years ago may now be contraindicated (e.g., the shift from passive modalities to active exercise for most conditions). A PT who stopped learning after graduation is not maintaining competence.

├— HEALTHCARE ADMINISTRATION

69. The 'patient journey' mapping approach in PT service quality improvement involves:

A. Staff scheduling only

B. Systematically documenting and analyzing every TOUCHPOINT of the patient's experience from REFERRAL through ASSESSMENT, TREATMENT, and DISCHARGE — identifying bottlenecks, delays, communication gaps, and opportunities to improve the patient experience and clinical outcomes

C. Financial audit only

D. Equipment maintenance scheduling

✓ **Answer: B**

💡 **Rationale & Explanation:**

Patient journey mapping: a quality improvement tool that traces every step a patient takes through the PT system: REFERRAL: how does the patient access PT? Wait times? Communication with referrer? INTAKE: reception process, paperwork, first impression; ASSESSMENT: wait time, privacy, thoroughness of evaluation, goal-setting conversation; TREATMENT: session quality, home exercise explanation, progress tracking; DISCHARGE: clear discharge criteria, follow-up plan, self-management support. MAPPING reveals: long wait times (a major dissatisfier); poor communication between referrer and PT; patients not understanding their diagnosis or treatment plan; unclear discharge criteria. IMPROVEMENTS targeting patient journey touchpoints consistently improve both patient satisfaction scores AND clinical outcomes. In Philippine PT departments: patient journey mapping has helped redesign outpatient clinic flows and reduce first-appointment waiting times.

ETHICS

70. A PT working in a research study must obtain informed consent from participants under which ethical framework?

A. Tuskegee principles

B. DECLARATION OF HELSINKI (1964, updated 2013) — the international standard for ethical conduct of medical/health research involving human subjects: informed consent, right to withdraw, risks vs. benefits, independent ethics committee review, participant privacy protection

C. Nuremberg Code only

D. Hippocratic Oath

✓ **Answer: B**

💡 **Rationale & Explanation:**

Declaration of Helsinki (DoH): the foundational international document governing ethical research involving human subjects. KEY PRINCIPLES: 1) INFORMED CONSENT: voluntary, free from coercion, adequately informed; 2) RIGHT TO WITHDRAW: any time, without penalty; 3) ETHICS COMMITTEE REVIEW (IRB/IEC): all research must be approved by an independent ethics committee; 4) VULNERABLE POPULATIONS: extra protections for children, prisoners, pregnant women, cognitively impaired; 5) RISKS AND BENEFITS: risks to individuals minimized, in proportion to expected benefits; 6) PUBLICATION ETHICS: negative results must be published (reduces publication bias); 7) PRIVACY: participant confidentiality protected. In the Philippines: research involving human subjects requires ETHICAL REVIEW BOARD (ERB) approval from the institution and adherence to the National Ethics Guidelines for Health and Health-Related Research (NEGHHR). Philippine PT researchers must follow both the DoH and Philippine-specific research ethics frameworks.

├— RESEARCH & EBP

71. The 'responsiveness' of a measurement tool means:

A. It gives the same result on repeated occasions

B. Its ABILITY TO DETECT CLINICALLY MEANINGFUL CHANGE OVER TIME when a true change has occurred — a tool with poor responsiveness will show no change even when the patient has genuinely improved

C. It measures what it claims to measure

D. It is simple to administer

✓ **Answer: B**

💡 **Rationale & Explanation:**

Responsiveness (also called 'sensitivity to change'): a property of measurement tools distinct from reliability (consistency) and validity

(accuracy). A responsive tool: shows significant score CHANGES when clinically meaningful patient changes occur; does NOT change when no true change has occurred. MEASURED BY: standardized response mean (SRM = mean change / SD of change); effect size; minimal detectable change (MDC) vs. MCID comparison. EXAMPLES: BBS is highly responsive to balance improvement in stroke; SF-36 is less responsive to small changes in musculoskeletal conditions (better for population-level than individual patient tracking). CLINICALLY: choosing a responsive outcome measure ensures your PT intervention's benefits are DETECTED and documented. Using a non-responsive measure (like a general health questionnaire for a patient with isolated shoulder pain) means you'll miss real improvements. Select outcome measures that are both valid/reliable AND responsive to change for your specific patient population.

├— PROFESSIONAL PRACTICE

72. The 'scope of practice' of a PT 'student' under clinical supervision in the Philippines is:

A. Identical to a licensed PT

B. LIMITED TO activities performed UNDER THE DIRECT SUPERVISION of a licensed RPT — the student may perform assessments and treatments as part of clinical education, but the SUPERVISING RPT bears professional responsibility for the care delivered

C. Broader than a licensed PT

D. Completely restricted — no patient contact

✓ Answer: B

💡 Rationale & Explanation:

PT student scope in clinical education: Philippine PT students on clinical internship/clerkship: CAN PERFORM clinical assessments and treatments as part of supervised learning. MUST: be directly supervised by a licensed RPT; have their work reviewed and countersigned by the supervisor; not practice independently; not sign

clinical documents with their own name as the treating therapist; not take professional responsibility for patient care. SUPERVISING RPT: holds professional and legal responsibility for all care; must be physically present or immediately available during student-patient interactions; reviews all documentation; co-signs clinical notes. PT students must clearly identify themselves as students to patients. The patient's right to decline treatment by a student must be respected. This supervised scope protects patients while facilitating experiential learning — the essential balance in clinical education.

├— HEALTHCARE ADMINISTRATION

73. The 'Donabedian triad' applied to PT outcome assessment: which component is MOST directly influenced by PT interventions?

A. Structure (number of PT staff)

B. OUTCOMES — the measurable results of care (pain reduction, improved function, goal attainment, patient satisfaction, return to work) — directly reflect the effectiveness of PT interventions

C. Process (treatment session length)

D. Structure (equipment available)

✓ Answer: B

💡 Rationale & Explanation:

Donabedian model applied to PT: STRUCTURE affects what's POSSIBLE (adequate staffing allows more individualized care; good equipment expands treatment options). PROCESS affects what IS DONE (evidence-based treatment selection, appropriate assessment, documentation quality). OUTCOMES reflect WHAT RESULTS from all of the above. PT can directly influence OUTCOMES through: evidence-based intervention selection (linked to best outcomes); individualized goal-setting (SMART goals improve patient motivation and goal attainment rates); optimal treatment intensity; patient education (improves adherence); outcomes monitoring (allows timely adjustments). In quality improvement: improving PROCESS metrics (using evidence-

based guidelines, improving assessment completeness) is the most reliable way to improve OUTCOMES. Structure improvements (more staff, better equipment) help but are insufficient without good processes. The Donabedian model remains the standard framework for PT quality assurance programs.

ETHICS

74. The 'whistleblower protection' provisions relevant to Philippine healthcare professionals mean:

A. PT should never report misconduct

B. A PT who REPORTS PROFESSIONAL MISCONDUCT (fraudulent billing, patient abuse, unlicensed practice, dangerous clinical practices) in GOOD FAITH should be PROTECTED FROM RETALIATION by the employer or institution — although Philippine-specific whistleblower provisions in healthcare are still developing

C. Whistleblowing always leads to disciplinary action

D. Only physicians can report misconduct

✓ Answer: B

💡 **Rationale & Explanation:**

Whistleblower protection in Philippine healthcare: several Philippine laws provide some whistleblower protection: Anti-Graft and Corrupt Practices Act; RA 6713 (Code of Conduct for Public Officials — relevant to government hospital staff); developing sector-specific provisions. INTERNATIONAL STANDARDS: the WMA and WCPT support whistleblower protection for health professionals reporting patient safety concerns. PT OBLIGATIONS: the PAPT Code of Ethics and RA 10210 create the obligation to report unsafe practices and misconduct. CHALLENGES IN THE PHILIPPINES: cultural factors (hiya — shame, authority deference) may discourage reporting; institutional protections for reporters may be inadequate in private settings; importance of DOCUMENTING everything before reporting to protect yourself. Best approach: use established internal reporting channels

first; involve professional organizations (PAPT) if institutional channels fail; document all communications; seek legal advice for serious allegations. Patient safety comes first despite professional and personal risks.

├— RESEARCH & EBP

75. The 'intention to treat' (ITT) analysis is preferred over 'per-protocol' analysis in RCTs because:

A. It is easier to calculate

B. It PRESERVES RANDOMIZATION and provides a REAL-WORLD EFFECTIVENESS ESTIMATE including all the non-compliance, dropout, and protocol deviations that occur in actual clinical practice — per-protocol analysis excludes dropouts and overestimates treatment efficacy

C. It requires smaller samples

D. It has better statistical power

✓ Answer: B

💡 Rationale & Explanation:

ITT vs. per-protocol analysis: PER-PROTOCOL analysis: only includes patients who completed the trial exactly as planned (all sessions attended, no deviations). PROBLEM: patients who dropped out or didn't comply are typically SICKER or LESS MOTIVATED — removing them from analysis produces a systematically healthier, more compliant sample → OVERESTIMATES treatment benefit in ideal patients. ITT: all randomized patients analyzed in their ASSIGNED groups, regardless of what happened. ADVANTAGES: 1) Preserves randomization balance; 2) Includes real-world dropout and non-compliance; 3) CONSERVATIVE estimate of treatment effect (includes 'failure' cases); 4) Represents what you'd expect in clinical practice. MISSING DATA handling in ITT: last observation carried forward (LOCF), multiple imputation, or mixed models. The CONSORT reporting standard requires ITT analysis for RCTs. When you see a PT study:

check if ITT was used — per-protocol results should be interpreted with caution.

├— PROFESSIONAL PRACTICE

76. Under PRC administrative order, a PT can be DISCIPLINED (license suspended or revoked) for which of the following?

A. Disagreeing with a physician's medical opinion

B. GROSS INCOMPETENCE, UNPROFESSIONAL CONDUCT, CONVICTION OF A CRIME INVOLVING MORAL TURPITUDE, FRAUDULENT PRACTICE, DRUG ADDICTION, GROSS VIOLATION OF ETHICAL STANDARDS, or PRACTICING WHILE LICENSE IS EXPIRED OR SUSPENDED

C. Being absent from work

D. Being a member of a union

✓ Answer: B

💡 **Rationale & Explanation:**

PRC grounds for PT license suspension or revocation (RA 10210 and PRC Act provisions): the Philippine Board of Physical Therapy can SUSPEND or REVOKE a PT's license for: 1) GROSS INCOMPETENCE or negligence; 2) UNPROFESSIONAL conduct (violating the Code of Ethics); 3) Conviction of a CRIME INVOLVING MORAL TURPITUDE (dishonesty, fraud, violence); 4) FRAUDULENT PRACTICE (signing documents for unperformed services, false claims); 5) DRUG ADDICTION or habitual intoxication; 6) GROSS VIOLATION OF ETHICAL STANDARDS; 7) Practicing with an EXPIRED or SUSPENDED license; 8) FALSE REPRESENTATION in the license application. PROCESS: a formal complaint is filed with the PBPT; investigation; formal hearing; decision. Appeals go through the Civil Service Commission and courts. These disciplinary provisions protect the public from unfit practitioners and uphold the integrity of the profession.

HEALTHCARE ADMINISTRATION

77. In a PHILIPPINE COMMUNITY-BASED REHABILITATION (CBR) program, the PT's primary role is:

A. Treating patients only in a clinic

B. EMPOWERING PERSONS WITH DISABILITIES AND THEIR FAMILIES through training, education, and advocacy at the COMMUNITY LEVEL — the PT teaches community health workers, trains family members, adapts the environment, promotes inclusion, and facilitates access to services rather than providing all direct care themselves

C. Prescribing medications

D. Administrative management only

✓ Answer: B

💡 **Rationale & Explanation:**

Community-Based Rehabilitation (CBR) — PT role: CBR is a MULTISECTORAL strategy that addresses health, education, livelihood, social, and empowerment needs of persons with disabilities in the community. The PT in CBR: TRAINS community health workers (barangay health workers, family members) to carry out simple rehabilitation activities; ASSESSES and ADAPTS the home environment for accessibility; PROVIDES DIRECT SERVICES for complex cases; ADVOCATES for inclusion of PWDs in school, work, and community; COORDINATES with other sectors (education, social welfare, livelihood). The CBR model is appropriate for the Philippine context where: most rural PTs serve large populations; health budgets are limited; the traditional clinic-based model leaves many PWDs without access. CBR is endorsed by WHO and the Philippine government (PWD Act, Magna Carta for Disabled Persons). This is a high-yield topic for Philippine PT boards — understand the CBR matrix.

RESEARCH & EBP

78. A PT is treating a patient with chronic LBP and wants to determine if the Oswestry Disability Index score improvement from 52 to 38 is clinically meaningful. The MCID for the ODI is approximately 10 points. What conclusion can be drawn?

A. No improvement occurred

B. The improvement of 14 points EXCEEDS the MCID of 10 points — the change IS CLINICALLY MEANINGFUL, suggesting the patient experienced a genuine, important improvement in function beyond measurement error

C. The improvement is statistically significant only

D. The ODI is not reliable

✓ Answer: B

💡 **Rationale & Explanation:**

Applying MCID in clinical practice: ODI improvement = 52 - 38 = 14 points. MCID for ODI = approximately 10 points. CONCLUSION: 14 > 10 = the change EXCEEDS the MCID = the patient experienced a CLINICALLY MEANINGFUL improvement — not just measurement noise or natural variation. This means the PT can conclude with reasonable confidence that the treatment produced a true, important benefit to this patient's functioning. MDC (Minimal Detectable Change) is the smallest change that exceeds measurement error (reliability threshold) — typically 8-10 points for ODI. If the change EXCEEDS MDC but is BELOW MCID: statistically 'real' change but not clinically important to the patient. When both MDC and MCID are exceeded (as in this case): real change AND clinically meaningful. This framework helps PTs document treatment effectiveness with clinical rigor, supporting evidence-based decisions about continuing, modifying, or discontinuing PT.

├— PROFESSIONAL PRACTICE

79. The 'World Physiotherapy' (formerly WCPT) position on PT entry-level education globally recommends:

A. Diploma-level training

B. An ENTRY-LEVEL PROFESSIONAL DEGREE at a minimum of BACHELOR'S DEGREE level, with a curriculum that includes biological and clinical sciences, PT theory and practice, evidence-based practice, clinical education, and professional development — globally, many countries are moving toward master's level entry

C. Associate degree

D. Certificate only

✓ Answer: B

💡 **Rationale & Explanation:**

World Physiotherapy education standards: World Physiotherapy (formerly WCPT — World Confederation for Physical Therapy) sets global standards for PT education. MINIMUM RECOMMENDATION: entry-level degree at BACHELOR'S LEVEL. TREND: many high-income countries now require MASTER'S DEGREE for entry (USA: DPT — Doctor of Physical Therapy; Canada: MScPT; UK: moving toward MSc level; Australia: Master's entry). PHILIPPINE CONTEXT: BSPT (Bachelor of Science in Physical Therapy) is the current entry-level degree, meeting the World Physiotherapy minimum. CHED oversees the curriculum. There is ongoing discussion in the Philippines about upgrading to master's level entry — as neighboring ASEAN nations develop their PT educational frameworks. This information is relevant for PT professionals thinking about international licensure and educational equivalency.

├— ETHICS

80. The 'principle of proportionality' in end-of-life PT care means:

A. Always provide maximum intervention

B. PT interventions should be proportional to the EXPECTED BENEFIT — in palliative/end-of-life care, treatments that cause significant burden (pain, exhaustion) without meaningful benefit should be

reconsidered; the goal shifts to COMFORT, QUALITY OF LIFE, and DIGNIFIED FUNCTION rather than restoration

C. Always withhold PT from dying patients

D. Prioritize physiological measures over patient comfort

✓ Answer: B

💡 **Rationale & Explanation:**

Proportionality in palliative PT: as a patient's condition progresses toward end of life, the goals and intensity of PT must be reconsidered. PROPORTIONALITY: the intervention's potential BENEFIT must be proportional to its BURDEN (effort, discomfort, time cost, side effects). In CURATIVE phase: aggressive rehabilitation may be appropriate even if temporarily uncomfortable. In PALLIATIVE phase: interventions should prioritize: comfort (pain/breathlessness management, positioning); dignity (assisting with valued activities as long as possible); quality of life (mobility enough for meaningful participation in important activities); family support (teaching family members comfort care techniques). In END-OF-LIFE phase: intensive strengthening and functional training may be disproportionately burdensome — gentle positioning, passive ROM to maintain comfort, assistance with functional activities the patient values, and caregiver education become the primary interventions. Philippine PTs in palliative care settings must develop comfort with this shift in goals and be advocates for appropriate proportionality in care planning.

├— PHILIPPINE PT LAW

81. The 'Professional Regulation Commission Act' (RA 8981) governs which aspect of PT practice?

A. Only PT education standards

B. The administration of ALL professional regulatory boards in the Philippines including the PBPT — it provides the framework for: examination administration, registration, accreditation, revocation of licenses, and disciplinary proceedings for all regulated professions

C. Private clinical guidelines only

D. International PT standards

✓ **Answer: B**

💡 **Rationale & Explanation:**

PRC Act (RA 8981, 2000): the umbrella law governing the Professional Regulation Commission. KEY PROVISIONS: 1) POWERS AND FUNCTIONS of the PRC: administer the licensure examination; maintain the roster of registered professionals; prescribe the qualifications for board members; issue certificates of registration; revoke, suspend, or reinstate licenses; 2) PROFESSIONAL REGULATORY BOARDS: created for each regulated profession (PBPT for PTs); exercise quasi-judicial functions; 3) EXAMINATION ADMINISTRATION: written examinations administered at least once a year; eligibility requirements; examination security; release of results. The PRC Act and RA 10210 together form the legal framework for PT practice in the Philippines. Every Filipino PT should know: RA 10210 (THE PT LAW) + RA 8981 (THE PRC FRAMEWORK) + RA 7836 (earlier version, now superseded) + PAPT Code of Ethics.

ETHICS

82. 'Beneficent paternalism' in healthcare means:

A. Always doing what the patient wants

B. OVERRIDING a patient's expressed preference because the provider believes they know what is BETTER FOR THE PATIENT — historically common (doctor knows best); MODERN ETHICS REJECTS paternalism in most cases, favoring patient autonomy, EXCEPT when the patient demonstrably lacks decision-making capacity

C. Providing extra care for free

D. Treating family members for free

✓ **Answer: B**

💡 **Rationale & Explanation:**

Beneficent paternalism: the belief that the clinician can and should make decisions for patients 'for their own good' — even when the patient disagrees. HISTORICAL CONTEXT: dominant in 20th-century medicine ('doctor knows best'). MODERN POSITION: paternalism is generally ethically UNJUSTIFIED for capacitated adults — it violates AUTONOMY (the primary contemporary bioethical principle). JUSTIFIED PATERNALISM (limited exceptions): when the patient TRULY LACKS CAPACITY (unconscious, severe cognitive impairment, acute psychosis); even then, surrogate decisions are preferred over pure clinical paternalism; SOFT PATERNALISM: nudging patients toward healthier choices through the way options are presented (acceptable if not coercive). IN PT: insisting a patient 'must' do exercises they refuse = paternalistic. The ethical approach: provide complete information, understand the patient's perspective, explore their reasons for refusal, offer alternatives, and ultimately RESPECT their autonomous decision. A PT who forces a patient to exercise against their will commits both an ethical violation and potentially battery (unlawful touching).

├─ RESEARCH & EBP

83. A 'systematic review without meta-analysis' (qualitative synthesis) differs from one WITH meta-analysis because:

A. Both are equally rigorous

B. The meta-analysis STATISTICALLY POOLS the data from individual studies into a SINGLE EFFECT SIZE ESTIMATE — possible only when studies are sufficiently homogeneous in population, intervention, comparison, and outcome; qualitative synthesis summarizes findings narratively when pooling is inappropriate due to clinical or statistical heterogeneity

C. Meta-analysis is always preferred

D. Qualitative synthesis lacks rigor

✓ Answer: B

💡 Rationale & Explanation:

Meta-analysis vs. qualitative synthesis: META-ANALYSIS: statistically combines quantitative data from multiple studies; produces a POOLED EFFECT SIZE with confidence interval; increases statistical power (larger effective sample size); uses forest plots for visualization. APPROPRIATE WHEN: studies are clinically homogeneous (same population, similar interventions, same outcomes); statistical heterogeneity is low (I^2 <50-75%); data available in compatible formats. NOT APPROPRIATE WHEN: studies are too diverse (comparing apples and oranges); heterogeneity is high (I^2 >75%); statistical pooling would produce a misleading average. QUALITATIVE SYNTHESIS: narrative summary of evidence; describes patterns across studies; appropriate when studies are too heterogeneous to pool. HETEROGENEITY TEST: I^2 statistic (<25% = low, 25-75% = moderate, >75% = high heterogeneity). HIGH HETEROGENEITY with meta-analysis = potential misleading result (the pooled estimate may not represent any real clinical population). Philippine PT researchers: when writing systematic reviews for theses or journals, correctly deciding whether to pool or synthesize narratively is a critical methodological skill.

├─ PROFESSIONAL PRACTICE

84. The 'continuing medical education (CME) vs. continuing professional education (CPE)' distinction in the Philippines:

A. They are identical

B. CME refers specifically to physician continuing education; CPE is the broader term used for ALL REGULATED PROFESSIONS (including PT) administered by the PRC; the mandatory CPE requirement for PT renewal is 45 UNITS per 3-year cycle

C. Only physicians need continuing education

D. PT does not require CPE

✓ Answer: B

💡 **Rationale & Explanation:**

CPE vs. CME in the Philippines: The Professional Regulation Commission uses the term CONTINUING PROFESSIONAL DEVELOPMENT (CPD) or CONTINUING PROFESSIONAL EDUCATION (CPE) for all regulated professions. CME specifically refers to medical doctor continuing education. PT CPE/CPD framework: 45 units per 3-year period for license renewal. CPE CATEGORIES (typical PRC recognition): Category A: post-graduate formal education (conferences, seminars, workshops — usually 1 unit/hour); Category B: self-directed learning (reading, online courses); Category C: professional service (committee work, teaching); Category D: research and publications. DOCUMENTATION: keep certificates and receipts; submit to the PRC at license renewal. PAPT role: PAPT accredits CPE providers and activities; their annual national conference is a major CPE source for Filipino PTs. Maintaining CPE records throughout the 3-year period avoids the last-minute rush to accumulate units before renewal.

├─ RESEARCH & EBP

85. 'Triangulation' in mixed-methods research is:

A. A geometric measurement technique

B. Using MULTIPLE DATA SOURCES, METHODS, OR THEORIES to gain a more COMPLETE and VALID understanding of a research question — e.g., combining quantitative (RCT measuring pain scores) with qualitative (interviews exploring patient experience of pain) to provide a richer picture

C. Randomization from three groups

D. A three-point scale

✓ Answer: B

💡 **Rationale & Explanation:**

Triangulation in mixed-methods research: researchers use triangulation to increase VALIDITY and COMPREHENSIVENESS: METHODS TRIANGULATION: using different data collection methods

(quantitative survey + qualitative interviews) for the same question; DATA TRIANGULATION: different data sources (patients + caregivers + PT notes) for the same question; INVESTIGATOR TRIANGULATION: multiple researchers independently analyze data, then compare findings; THEORY TRIANGULATION: multiple theoretical frameworks applied to interpret the same data. EXAMPLE in PT: to understand why patients don't adhere to home exercise programs: quantitative: measure adherence rates via activity monitors; qualitative: interview patients about barriers and facilitators. The two methods TRIANGULATE: if both show time constraints are the main barrier → CONVERGENT VALIDITY. If they diverge → deeper investigation needed. Mixed-methods research is increasingly valued in PT because it captures BOTH the statistical outcomes AND the human experience of rehabilitation.

├— ETHICS

86. The 'right to information' of a patient in the Philippines is protected by:

A. No specific law

B. DATA PRIVACY ACT (RA 10173 — right to access their own health data), the CONSUMER ACT, and general INFORMED CONSENT principles — patients have the RIGHT to receive accurate, complete information about their diagnosis, treatment options, risks, benefits, and prognosis in a language they can understand

C. Only international treaties

D. The Philippine Medical Act only

✓ Answer: B

💡 Rationale & Explanation:

Patient right to information in the Philippines: LEGAL PROTECTION: RA 10173 (Data Privacy Act): patients have the right to access, correct, and receive copies of their personal health data held by healthcare providers. CONSUMER ACT of the Philippines (RA 7394): protects

consumers of healthcare services, including the right to accurate information. INFORMED CONSENT LAW: the patient's right to full disclosure before agreeing to treatment is both ethically and legally established. DOH PATIENT'S BILL OF RIGHTS: administrative guidance reinforcing patient rights including information. LINGUISTIC ACCESSIBILITY: information must be provided in a LANGUAGE THE PATIENT UNDERSTANDS — using complex medical jargon when the patient doesn't understand it violates the spirit of the right to information. PT IMPLICATIONS: use plain language (Filipino, local dialect when needed); provide written summaries when helpful; verify understanding (ask the patient to explain back what they've understood); document what was communicated and when.

├— PROFESSIONAL PRACTICE

87. The 'professional seal' requirement for PT documents in the Philippines means:

A. Any stamp is acceptable

B. A registered PT must affix their OFFICIAL SEAL (showing their name, PRC registration number, and 'Registered Physical Therapist') along with their signature on clinical documents they are professionally responsible for — this is a legal requirement under PRC regulations

C. Only hospitals use PT seals

D. Seals are optional

✓ Answer: B

💡 **Rationale & Explanation:**

PT professional seal: Philippine PRC regulations require registered professionals to use their OFFICIAL SEAL on documents that represent their professional work. For PTs: the seal includes: full name; title (RPT — Registered Physical Therapist); PRC registration number; PTR number (Professional Tax Receipt). It is affixed using: rubber stamp, electronic seal (for digital documents), or embossed seal. REQUIRED ON: evaluation reports, progress notes, medical certificates, referral

letters, research publications, and other official PT documents. LEGAL SIGNIFICANCE: affixing the seal certifies the PT's professional responsibility for the document's content. NEVER seal documents you did not prepare or patient care you did not perform. The seal + signature combination creates the legally binding professional certification of clinical work. Misuse of the seal (sealing others' work, sealing false documents) constitutes a serious professional violation under RA 10210 and RA 8981.

├— RESEARCH & EBP

88. 'Concurrent validity' of a PT assessment tool means:

A. The test gives the same result twice in the same patient

B. The NEW ASSESSMENT TOOL correlates highly with an already VALIDATED GOLD STANDARD measure for the same construct — establishing that the new tool measures what it claims to measure

C. The test predicts future outcomes

D. Inter-rater agreement

✓ Answer: B

💡 **Rationale & Explanation:**

Concurrent validity: a type of CRITERION VALIDITY (how well the test measures compared to a criterion/gold standard). CONCURRENT: both the new test and the gold standard are administered at the SAME TIME (concurrently). HIGH CORRELATION = good concurrent validity. EXAMPLE: validating the 30-second chair stand as a measure of lower extremity strength — correlate it with isokinetic quadriceps strength testing (gold standard) in the same session. High correlation ($r > 0.70$-0.80) = the chair stand test has concurrent validity for measuring LE strength. Compare PREDICTIVE VALIDITY: the new test is administered NOW and the gold standard is measured LATER (the new test predicts future gold standard performance). IMPORTANT FOR PT: when adopting a new outcome measure, check if it has been validated concurrently against an existing gold standard for your patient

population. A test that was validated in healthy adults may not have concurrent validity in your specific patient group (e.g., post-stroke patients).

├─ HEALTHCARE ADMINISTRATION

89. A physical therapy 'productivity standard' of 40-50 UNITS per day in an inpatient facility means:

A. Number of patients seen

B. The number of 15-MINUTE BILLING UNITS of direct patient care that a PT is expected to provide per day — 40 units = 10 hours of direct patient care (standard in US inpatient PT), though this creates tension with documentation time, patient preparation, and staff meetings

C. Number of exercises prescribed

D. Daily step count

✓ Answer: B

💡 **Rationale & Explanation:**

PT productivity metrics: BILLING UNITS: in fee-for-service PT, services are often billed in 15-minute increments (one 'unit' = one 15-minute period of direct care). A standard of 40 units = 10 hours of direct patient care per 8-hour day (non-realistic in most settings because preparation, documentation, and team communication also take time). Realistic productivity: 20-35 units/day is more common in practice. CONSEQUENCES OF HIGH PRODUCTIVITY STANDARDS: 1) Documentation is rushed or done during home time (burnout risk); 2) Less time for PATIENT EDUCATION and CAREGIVER TRAINING (which are therapeutic but not well-reimbursed); 3) Pressure to see patients when not clinically ready; 4) ETHICAL TENSION: the PT's duty to provide quality care vs. institutional productivity demands. In the Philippines: Philippine PT productivity is typically measured by patient volume rather than billing units. Advocating for ADEQUATE TIME PER PATIENT is a professional obligation — quality cannot be maintained with excessively high patient loads.

ETHICS

90. The 'moral residue' concept in healthcare ethics refers to:

A. Ethical clarity after difficult decisions

B. The PERSISTENT PSYCHOLOGICAL AND ETHICAL DISCOMFORT that remains after a clinician has made a difficult ethical decision — even when they believe they made the right choice, the weight of the moral compromise (having been unable to act perfectly ethically due to constraints) remains

C. The list of ethical principles

D. Conflict resolution

✓ Answer: B

💡 **Rationale & Explanation:**

Moral residue: a term from nursing and healthcare ethics literature (Jameton, Webster and Baylis). When a PT faces a situation of MORAL DISTRESS (knowing the right thing but being constrained from doing it) and makes the 'least bad' available choice: even after making what they believe is the best possible decision, a feeling of MORAL DISCOMFORT persists. Example: a PT discharges a patient prematurely due to insurance refusal, knowing the patient still needs care. They do everything possible (thorough home exercise program, referral to community PT, family training) — but they still feel the weight of the inadequate outcome. MANAGEMENT of moral residue: institutional support structures (ethics committees, peer support groups); reflective practice (journaling, supervision); peer debriefing; recognizing that moral residue is NORMAL — it indicates the PT CARES about their patients; advocacy to prevent recurrence (advocating for better insurance coverage, appropriate discharge criteria). Unaddressed cumulative moral residue leads to MORAL BURNOUT and COMPASSION FATIGUE.

RESEARCH & EBP

91. 'External validity' of a clinical study refers to:

A. Statistical significance

B. The degree to which the study's FINDINGS CAN BE GENERALIZED to populations and settings OUTSIDE the study — determined by how representative the sample and setting are of the target clinical population

C. Internal consistency of measurements

D. Blinding procedures

✓ Answer: B

💡 Rationale & Explanation:

External validity (generalizability): a clinical study has HIGH external validity when: the STUDY POPULATION closely resembles the clinical population you treat (same age, comorbidities, severity, setting); the INTERVENTION was delivered in a way comparable to how you would use it; the SETTING (university hospital vs. community clinic) is similar to your practice. LOW external validity (poor generalizability): highly selected sample (exclude elderly, comorbid patients); perfect protocol adherence (unrealistic in real-world PT); highly specialized therapists (not generalizable to average clinicians). WHY IT MATTERS FOR PHILIPPINE PT: most high-quality PT RCTs are conducted in North America, Europe, or Australia. Their populations, healthcare systems, and resource levels differ from the Philippine context. Before applying evidence to Philippine practice: assess whether the study population resembles your patients; whether the intervention is feasible in your setting (equipment, time, staffing); whether outcomes are relevant to your patients' goals. This is 'contextually appropriate evidence-based practice' — a critical PT competency.

PROFESSIONAL PRACTICE

92. The 'PAPT code of ethics' requires members to:

A. Prioritize PAPT membership fees above patient care

B. MAINTAIN PROFESSIONAL COMPETENCE, PLACE PATIENT WELFARE FIRST, UPHOLD THE DIGNITY OF THE PROFESSION, COLLABORATE WITH COLLEAGUES, and ADVANCE THE SCIENCE OF PHYSICAL THERAPY — consistent with the World Physiotherapy code of ethics

C. Only follow government orders

D. Avoid all professional development after graduation

✓ Answer: B

💡 **Rationale & Explanation:**

PAPT Code of Ethics principles: aligned with World Physiotherapy's ethical principles. KEY COMMITMENTS: 1) PATIENT WELFARE: the PT's primary responsibility is to the patient — all clinical decisions prioritize the patient's health and wellbeing; 2) PROFESSIONAL COMPETENCE: ongoing education, staying current with evidence, recognizing limits of practice and seeking consultation; 3) PROFESSIONAL INTEGRITY: honesty, transparency, avoiding conflicts of interest; 4) RESPECT FOR PERSONS: dignity, privacy, confidentiality, cultural sensitivity; 5) PROFESSIONAL RESPONSIBILITIES: contributing to the profession through teaching, research, advocacy; 6) SOCIETAL RESPONSIBILITIES: promoting public health, equitable access to PT; 7) COLLEGIAL RELATIONSHIPS: respectful, collaborative interactions with colleagues. PT students should receive ethics education that addresses real-world applications of these principles in Philippine healthcare settings — from resource constraints to interprofessional conflicts to cultural considerations in patient communication.

├— HEALTHCARE ADMINISTRATION

93. The 'lean healthcare' principles applied to a PT outpatient clinic aim to:

A. Increase paperwork and wait times

B. ELIMINATE WASTE (unnecessary steps, waiting, motion, over-processing, over-production, defects, and underutilized talent) while MAXIMIZING VALUE FOR THE PATIENT — borrowed from the Toyota Production System and adapted for healthcare quality improvement

C. Reduce patient throughput

D. Only apply to manufacturing

✓ **Answer: B**

💡 **Rationale & Explanation:**

Lean healthcare applied to PT clinics: SEVEN WASTES (Toyota/lean adapted for healthcare): 1) WAITING: patients waiting for PT appointments, documents, or equipment; 2) OVERPROCESSING: unnecessary documentation, redundant assessments; 3) OVERPRODUCTION: scheduling more patients than can be seen with quality; 4) TRANSPORT: excessive patient or staff movement; 5) MOTION: PT spending time looking for equipment, walking to supply rooms; 6) INVENTORY: unused or expired supplies; 7) DEFECTS: documentation errors, incorrect treatments. LEAN TOOLS in PT: 5S organization (Sort, Shine, Set-in-order, Standardize, Sustain) — keeping treatment rooms organized reduces motion waste; VALUE STREAM MAPPING — mapping the entire patient journey to identify bottlenecks; KANBAN — visual signals for supply management; STANDARD WORK — standardized processes for common PT procedures ensuring consistency. BENEFIT: PT departments implementing lean principles report: reduced wait times, improved patient satisfaction, reduced documentation burden, and improved staff morale. Relevant for PT managers and department heads in Philippine hospitals.

ETHICS

94. The 'duty of care' in Philippine law for healthcare providers means:

A. Care is optional

B. The legal and ethical obligation to provide care that meets the STANDARD OF CARE — what a REASONABLY COMPETENT PROFESSIONAL with similar training would do in similar circumstances — failure to meet this standard and causing harm = NEGLIGENCE

C. Only basic first aid

D. Maximum possible effort regardless of resources

✓ Answer: B

💡 **Rationale & Explanation:**

Duty of care and negligence in Philippines: for a PT to be found NEGLIGENT, four elements must be proven: 1) DUTY OF CARE existed (PT-patient relationship established); 2) BREACH of that duty (treatment fell below the standard of care); 3) CAUSATION (the breach caused harm); 4) DAMAGES (actual harm occurred). STANDARD OF CARE: what a reasonable, competent PT with equivalent training would do in equivalent circumstances. This does NOT require perfect care — only REASONABLE care. COMMON PT NEGLIGENCE SCENARIOS: leaving a patient unattended during a modality treatment (patient burned or falls); failing to screen for contraindications to a treatment (applying US over malignancy); poor documentation that prevents continuity of care; failure to recognize and respond to a red flag. PROTECTION: follow evidence-based guidelines; document thoroughly; obtain informed consent; recognize the limits of your competence; refer appropriately; maintain adequate supervision of students/aides. Malpractice insurance (professional liability insurance) is strongly recommended for all practicing PTs in the Philippines.

├— RESEARCH & EBP

95. 'Case study research' in PT (qualitative) differs from a 'case report' (clinical) in that:

A. Both are identical

B. CASE STUDY RESEARCH is a SYSTEMATIC, IN-DEPTH INVESTIGATION of a phenomenon within its real-world context, using multiple data

sources and with explicit methodological rigor — the purpose is THEORETICAL UNDERSTANDING; a CASE REPORT is a clinical description of an interesting or unusual patient presentation, primarily for clinical education and communication

C. Both require randomization

D. Only case reports are published

✓ Answer: B

💡 **Rationale & Explanation:**

Case study research vs. case report: CASE REPORT (clinical): a descriptive document reporting: unusual diagnosis, rare condition presentation, unexpected treatment response, or interesting clinical scenario; purpose = CLINICAL EDUCATION and AWARENESS; evidence level = low (Level V); typically 500-2000 words; published in clinical journals; no explicit research methodology required. CASE STUDY RESEARCH (qualitative research methodology): multiple data sources (interviews, observations, documents, clinical measures); explicit methodology (data collection protocol, analysis method, member checking, transferability assessment); purpose = UNDERSTANDING a complex phenomenon in context (e.g., how does a PT's clinical reasoning develop during their first year of practice?); evidence level = higher than case reports for qualitative questions; MULTIPLE CASE STUDIES can be analyzed together (cross-case analysis). In Philippine PT education: many thesis projects use case study methodology — these must follow qualitative research standards, not just describe a single clinical case. Understanding this distinction helps PT students design and write appropriate qualitative research.

├─ PROFESSIONAL PRACTICE

96. The 'interprofessional team' (IPT) in Philippine rehabilitation typically includes all of the following EXCEPT:

A. Physical Therapist

B. BARANGAY HEALTH WORKER (BHW) — while BHWs are crucial in community health and CBR, they are not typically members of the SPECIALIST INPATIENT REHABILITATION TEAM (which includes PT, OT, SLP, nurse, physician, social worker, psychologist); BHWs are community-level workers who may bridge the gap between formal rehabilitation and the home environment

C. Occupational Therapist

D. Medical social worker

✓ **Answer: B**

💡 **Rationale & Explanation:**

Inpatient rehabilitation team composition: The SPECIALIST INPATIENT REHABILITATION TEAM in a Philippine tertiary hospital typically includes: PHYSIATRIST (physical medicine and rehabilitation physician) — team leader; PHYSICAL THERAPIST; OCCUPATIONAL THERAPIST; SPEECH-LANGUAGE PATHOLOGIST; REHABILITATION NURSE; MEDICAL SOCIAL WORKER (social welfare, discharge planning, financial support); CLINICAL PSYCHOLOGIST (TBI, chronic pain, adjustment disorders); CLINICAL NUTRITIONIST-DIETITIAN; PROSTHETIST-ORTHOTIST (as needed). BARANGAY HEALTH WORKER (BHW): a community-level health worker — trained to provide basic preventive care in the barangay; plays a role in COMMUNITY-BASED REHABILITATION (CBR) — but is NOT typically a member of the specialist inpatient team. In CBR contexts: BHWs, community volunteers, and teachers are integral to the multi-sectoral team. This question tests understanding of the different levels of the healthcare system and appropriate team composition.

├— RESEARCH & EBP

97. The 'systematic review protocol registration' (PROSPERO, Open Science Framework) is done BEFORE data collection to:

A. Satisfy journal requirements only

B. Prevent OUTCOME REPORTING BIAS — pre-registering the primary outcomes, inclusion criteria, and analysis plan before conducting the review ensures transparency and prevents selective reporting of favorable outcomes after results are known

C. Ensure government funding

D. Save time in writing

✓ Answer: B

💡 **Rationale & Explanation:**

PROSPERO systematic review registration: PROSPERO (International Prospective Register of Systematic Reviews, University of York) — a free registry for systematic review protocols. PURPOSE: 1) TRANSPARENCY: researchers declare their methods BEFORE seeing the results; 2) PREVENTION OF SELECTIVE REPORTING BIAS: pre-specified outcomes cannot be changed after results are known (if outcomes are registered, reviewers cannot add positive outcomes and delete negative ones after analysis); 3) DUPLICATION PREVENTION: allows researchers worldwide to see what reviews are in progress, avoiding redundant work; 4) ACCOUNTABILITY: registered reviews can be compared with published versions to identify any deviations from the protocol. SIGNIFICANCE: journals increasingly require PROSPERO registration for systematic review publication. In Philippine PT research: graduate PT students conducting systematic reviews for their theses should register their protocols in PROSPERO early in the process — it demonstrates rigor and is increasingly required by ethics committees and journals in the Philippine academic context.

├— ETHICS

98. The 'triage ethics' during a MASS CASUALTY INCIDENT (MCI) or disaster — the PT's role and ethical considerations include:

A. PT has no role in MCIs

B. The PT should be prepared to TRIAGE, prioritize, and allocate limited resources based on MAXIMIZING OVERALL GOOD (utilitarian

ethics — greatest good for the greatest number) rather than individual beneficence — this may mean withholding care from the most severely injured when survival is not possible, to focus on those who can benefit most

C. Always prioritize the most severely injured

D. Only treat sports injuries during disasters

✓ Answer: B

💡 **Rationale & Explanation:**

MCI triage ethics for PTs: in disaster or mass casualty events, normal healthcare ethics (individual beneficence) is replaced by POPULATION-LEVEL UTILITARIAN ETHICS: the goal is to SAVE THE MOST LIVES with limited resources. START TRIAGE categories (Simple Triage and Rapid Treatment): Immediate (Red) = life-threatening but SURVIVABLE with immediate intervention; Delayed (Yellow) = serious but can wait; Minor (Green) = 'walking wounded,' minor injuries; Expectant (Black) = fatal injuries, death imminent — do NOT use significant resources here. PT SKILLS IN DISASTERS: triage assessment; field stabilization; airway positioning; basic wound care; patient movement assistance; rehabilitation of mass casualty survivors. ETHICAL TENSION: in a disaster, a PT may have to walk past a critically injured person to treat a more salvageable patient — this violates normal beneficence but serves utilitarian disaster ethics. Ethical debriefing AFTER the disaster is essential for healthcare providers who made such decisions.

├— PROFESSIONAL PRACTICE

99. Under RA 10210, practicing 'Physical Therapy' without a license constitutes:

A. A minor administrative violation

B. A CRIMINAL OFFENSE — practicing as a PT without a valid PRC license violates RA 10210 and the PRC Act; penalties include FINE and/or IMPRISONMENT as specified in the law; this also applies to facilities that employ or allow unlicensed individuals to practice PT

C. A civil violation only

D. Not regulated

✓ **Answer: B**

💡 **Rationale & Explanation:**

Unlicensed PT practice in the Philippines: RA 10210 SECTION 30 (Penal Clause — paraphrased): any person who practices physical therapy in the Philippines without a valid Certificate of Registration and Professional Identification Card; or allows another person to practice physical therapy on their behalf using their license; or falsely claims to be a registered physical therapist; SHALL be punished by FINE AND/OR IMPRISONMENT as prescribed by the law. ENFORCEMENT: the PRC, PBPT, and appropriate law enforcement agencies share enforcement responsibility. WHO IS AT RISK: individuals offering PT services without a license; facilities employing unlicensed practitioners (the facility management can also face liability); massage therapists who offer 'physical therapy' services beyond their scope. PT'S OBLIGATION: report known cases of unlicensed PT practice to the PBPT/PRC or PAPT. This enforcement mechanism protects the public from untrained practitioners who could cause harm.

├— RESEARCH & EBP

100. In PT outcome research, 'responsiveness' can be measured by the 'Standardized Response Mean' (SRM). An SRM of 0.8 represents:

A. A small effect

B. A LARGE effect (0.8 is the large threshold by Cohen's conventions, same as Cohen's d: small <0.2, medium 0.5, large 0.8) — it means the average change after treatment is 0.8 standard deviations of the change score, indicating the outcome measure is highly responsive to clinically meaningful change

C. A medium effect

D. No effect

✓ **Answer: B**

💡 **Rationale & Explanation:**

Standardized Response Mean (SRM) for responsiveness: SRM = Mean Change / Standard Deviation of Change. Interpretation (using Cohen's conventions): <0.2 = small (poorly responsive); 0.2-0.5 = small-medium; 0.5-0.8 = medium; >0.8 = large (highly responsive). SRM ≈ 0.8 means: the mean change is 0.8 SDs of the change distribution — this is a LARGE treatment effect for the outcome measure, indicating it is VERY RESPONSIVE to change. In selecting outcome measures: prefer measures with HIGH SRM in the specific population you're treating (they will detect real changes in your patients). COMPARE with MDC (Minimal Detectable Change): MDC tells you if a change is REAL (above measurement error); SRM tells you how well the tool CAPTURES REAL changes. MCID tells you if a real change is CLINICALLY MEANINGFUL. Using all three statistics together: an outcome measure is good when: SRM is large (responsive) + MDC is small relative to MCID + valid and reliable.

├— HEALTHCARE ADMINISTRATION

101. The 'ISO 9001' quality management standard is relevant to Philippine PT clinics because:

A. It only applies to manufacturing

B. It provides a FRAMEWORK FOR CONSISTENT QUALITY SERVICE DELIVERY through: documented processes, staff competency assurance, continuous improvement, customer (patient) satisfaction measurement, and management commitment — PT clinics seeking ISO certification demonstrate commitment to standardized, high-quality care

C. It sets PT treatment protocols

D. Only government hospitals need ISO

✓ **Answer: B**

💡 **Rationale & Explanation:**

ISO 9001 Quality Management System (QMS) for PT clinics: ISO 9001 is the international standard for QUALITY MANAGEMENT SYSTEMS — applicable to any organization, including healthcare. REQUIREMENTS: PROCESS DOCUMENTATION: all clinical and administrative processes must be defined and documented (patient flow, assessment protocols, complaint procedures); COMPETENCY MANAGEMENT: staff qualifications, training records, CPE compliance; CUSTOMER FOCUS: patient satisfaction surveys, complaint management, feedback mechanisms; CONTINUOUS IMPROVEMENT: regular review of outcomes and processes to identify improvement opportunities; MANAGEMENT REVIEW: leadership reviews quality data and drives improvement. PHILIPPINE CONTEXT: Joint Commission International (JCI) accreditation for hospitals; PhilHealth accreditation for insurance reimbursement; ISO 9001 for quality management. PT department certification signals to patients, referring physicians, and insurance companies that the PT service meets international quality standards. While not mandatory for PT practices, ISO certification is increasingly competitive in private healthcare settings.

ETHICS

102. The 'duty to warn' (Tarasoff principle) in PT ethics applies when:

A. A patient discusses financial problems

B. A PATIENT COMMUNICATES A SPECIFIC, CREDIBLE THREAT TO HARM AN IDENTIFIABLE PERSON — the PT (like all healthcare providers) has an ethical and potentially legal duty to warn the potential victim or inform appropriate authorities, which OVERRIDES the duty of confidentiality in this exceptional case

C. A patient expresses frustration

D. A patient is non-compliant

✓ Answer: B

💡 **Rationale & Explanation:**

Tarasoff duty to warn: named after Tarasoff v. Regents of University of California (1976). A therapist's client threatened to kill a specific woman (Tatiana Tarasoff); the therapist did not warn the woman; the client killed her; the court held the therapist had a duty to protect the potential victim. CURRENT APPLICATION: when a patient makes a SPECIFIC, CREDIBLE THREAT against an IDENTIFIABLE PERSON, healthcare providers have an ethical (and in some jurisdictions, legal) duty to: warn the potential victim, inform law enforcement, or take other reasonable protective actions — even if this breaches confidentiality. APPLICABILITY IN PT: PT is not primarily a mental health provider, but may encounter patients who express threats. The specific threat must be: specific (not vague frustration), credible (serious intent), against an identifiable target. In the Philippines: no specific Tarasoff-equivalent legislation; however, the CIVIL CODE'S general duty of care and healthcare ethics principles support a duty to warn in these circumstances. When in doubt: consult with a supervisor, institutional ethics committee, or legal counsel.

├─ PROFESSIONAL PRACTICE

103. The 'scope of practice' concept in Filipino PT: a PT who performs a procedure they are trained in but which has not yet been explicitly included in official regulatory guidance should:

A. Never perform any undocumented procedure

B. USE PROFESSIONAL JUDGMENT: consider if the procedure falls within PT's broad scope (physical agents, manual therapy, exercise, functional rehabilitation); ensure they have ADEQUATE TRAINING and COMPETENCE; document rationale; consider consulting with PAPT or PBPT if uncertainty remains; recognize that emerging evidence may warrant new practices not yet captured in old regulations

C. Perform any procedure without training

D. Defer to medical staff always

✓ **Answer: B**

💡 **Rationale & Explanation:**

Scope of practice and emerging PT practices: PT scope is not a static, exhaustive list of permitted procedures — it is a FRAMEWORK based on PT's training, competency, and professional judgment. EXAMPLES OF EVOLVING SCOPE: dry needling (not yet explicitly regulated in Philippines; PTs with training are performing it in some settings); taping techniques; ergonomic assessment; telehealth; sports performance coaching; pelvic floor rehabilitation. When considering an emerging practice: 1) IS IT WITHIN THE BROAD DEFINITION OF PT? (physical agents, manual therapy, therapeutic exercise, functional rehabilitation, education); 2) Do I have ADEQUATE TRAINING and COMPETENCE? (certification, supervised practice); 3) IS IT SAFE for the patient? (evidence base, risk-benefit); 4) Is there a PROFESSIONAL ORGANIZATION GUIDANCE? (PAPT position statements). Practicing outside competence = always wrong. Practicing an emerging evidence-based technique with proper training = professional evolution. The PBPT/PAPT should be consulted when there is significant uncertainty about a specific practice.

├─ RESEARCH & EBP

104. The 'GRADE evidence quality classification' for a BODY OF EVIDENCE (not individual studies) considers:

A. Only whether it is an RCT

B. RISK OF BIAS of included studies, INCONSISTENCY (heterogeneity), INDIRECTNESS (how directly the evidence applies to the clinical question), IMPRECISION (wide confidence intervals), and PUBLICATION BIAS — a single high-quality RCT may still yield MODERATE or LOW quality GRADE evidence if these other factors are present

C. Study size only

D. Journal impact factor

✓ **Answer: B**

💡 **Rationale & Explanation:**

GRADE quality of evidence assessment: GRADE starts with STUDY DESIGN (RCTs = high starting quality; observational studies = low) then GRADES DOWN for: 1) RISK OF BIAS: high risk in individual studies reduces quality; 2) INCONSISTENCY: heterogeneous results across studies (high I^2) reduces quality; 3) INDIRECTNESS: if the study population, intervention, comparator, or outcome is different from the clinical question → indirect evidence is lower quality; 4) IMPRECISION: wide confidence intervals (especially crossing the null or the MCID) → reduce quality; 5) PUBLICATION BIAS: evidence of selective reporting → reduce quality. GRADES UP for: large effect size, dose-response relationship. FINAL EVIDENCE QUALITY: HIGH = we are very confident; MODERATE = we are moderately confident; LOW = our confidence is limited; VERY LOW = we have very little confidence in the effect estimate. RECOMMENDATION STRENGTH: STRONG (we recommend) or CONDITIONAL/WEAK (we suggest) — based on quality of evidence + benefits vs. harms + patient values + resource considerations.

├─ PROFESSIONAL PRACTICE

105. In managing WORKPLACE HAZARDS specific to PT practice, the primary ERGONOMIC RISK for PTs is:

A. Noise exposure

B. MUSCULOSKELETAL INJURY from manual patient handling — transfers, mobilizations, gait training, and manual therapy place high cumulative physical demands on the PT's back, shoulders, and upper extremities; PT has one of the HIGHEST rates of work-related musculoskeletal disorders among healthcare professions

C. Chemical exposure

D. Radiation exposure

✓ **Answer: B**

💡 **Rationale & Explanation:**

PT work-related musculoskeletal disorders (WMSDs): PT is a PHYSICALLY DEMANDING PROFESSION. HIGH-RISK ACTIVITIES: Patient TRANSFERS (bed-to-chair, from floor); MANUAL THERAPY techniques (cervical mobilization, hip manipulation); GAIT TRAINING (supporting patients who are unsteady); AQUATIC THERAPY (reaching into the pool); PROLONGED AWKWARD POSTURES (leaning over a treatment table). STATISTICS: up to 60-70% of PTs report experiencing a WMSD during their career; 45% have had time off work due to injury. PREVENTION: SAFE PATIENT HANDLING AND MOBILITY (SPHM) protocols: use mechanical lifts and slide sheets; proper body mechanics; assistive devices; TEAM LIFTING when loads exceed 35 lbs; ergonomic workplace design (adjustable treatment tables — height-adjustable tables are essential); regular exercise and stretching for PTs themselves; reporting injuries early. The irony: PT professionals who teach patients how to avoid injuries often neglect their own ergonomic health. PAPT advocates for safe patient handling standards in Philippine healthcare facilities.

ETHICS

106. 'Conflict of interest' in PT practice arises when:

A. A PT treats multiple patients simultaneously

B. A PT has a FINANCIAL, PERSONAL, OR PROFESSIONAL INTEREST that could INAPPROPRIATELY INFLUENCE their clinical decisions — e.g., referring patients to their own private practice (self-referral), prescribing equipment from which they receive commission, or practicing in a facility they own without transparency to the patient

C. A PT disagrees with a physician

D. A PT takes sick leave

✓ **Answer: B**

💡 **Rationale & Explanation:**

Conflicts of interest in PT: TYPES: FINANCIAL: PT refers patients to their own facility/equipment company (self-referral — PT benefits financially from the referral); receives gifts/incentives from equipment vendors to recommend their products; owns a private clinic and works at a referring hospital (patients may be directed to the PT's clinic without the patient's full informed choice. PERSONAL: treating family members/friends (personal relationship may distort clinical judgment). PROFESSIONAL: pressure to discharge patients who are still clinically needy (institutional pressure to reduce costs). MANAGEMENT: DISCLOSURE: inform patients of any potential conflict (e.g., 'I have a financial interest in this clinic I'm referring you to'); RECUSAL: when the conflict cannot be managed, remove yourself from the decision; TRANSPARENCY: keep all clinical referral decisions based on PATIENT BEST INTEREST. IN RESEARCH: disclose all funding sources and potential conflicts in publications. COI management is a cornerstone of professional integrity and patient trust.

├─ RESEARCH & EBP

107. A '95% confidence interval (CI)' that crosses the 'line of no effect' (0 for mean differences, 1.0 for risk ratios) in a PT clinical trial means:

A. The treatment is definitely effective

B. The RESULT IS NOT STATISTICALLY SIGNIFICANT at the p<0.05 level — the true effect is uncertain (it could be zero or even in the opposite direction); this does NOT mean the treatment doesn't work, just that this study was unable to DETECT a statistically significant effect

C. The treatment is harmful

D. The CI is too wide to be valid

✓ Answer: B

💡 **Rationale & Explanation:**

Confidence intervals and the line of no effect: 95% CI crossing the null: if the 95% CI includes 0 (for mean differences) or 1.0 (for risk ratios or odds ratios), the study result is NOT STATISTICALLY SIGNIFICANT at the

conventional p<0.05 alpha level. INTERPRETATION: the true effect could be zero (no effect), positive (beneficial), or negative (harmful) — this study doesn't have enough precision to determine which. IMPORTANT NUANCE: a CI just crossing the null (e.g., CI: -0.5 to 15.0 for a pain reduction outcome) is different from a CI far from the null on both sides (CI: -15 to 15) — the former suggests a probably positive effect that the study was underpowered to confirm statistically; the latter suggests truly no effect. CLINICAL DECISION-MAKING: consider the WHOLE CI, not just whether it crosses the null — a CI from -0.5 to 15.0 suggests the treatment is LIKELY effective but the study couldn't prove it statistically (likely underpowered). This nuanced interpretation of CIs is a key EBP competency for Philippine PTs.

├─ HEALTHCARE ADMINISTRATION

108. 'Telehealth physical therapy' documentation requirements include:

A. No documentation needed for telehealth

B. The SAME ELEMENTS as in-person PT documentation PLUS: confirmation that the patient CONSENTED to telehealth; documentation of the TECHNOLOGY PLATFORM USED; note that physical examination was conducted via VIDEOCONFERENCE (including any limitations); emergency protocols explained; the PATIENT'S LOCATION at the time of the session

C. Shorter notes than in-person PT

D. Only billing codes

✓ Answer: B

💡 **Rationale & Explanation:**

Telehealth PT documentation standards: documentation must be as complete as in-person PT PLUS telehealth-specific elements: 1) PATIENT LOCATION: document where the patient was physically located during the session (important for jurisdictional licensure questions); 2) TECHNOLOGY PLATFORM: note the video platform used (must be HIPAA-compliant/RA 10173-compliant — encrypted, private);

3) CONSENT: document that telehealth consent was obtained (verbal at minimum; written preferred); 4) PHYSICAL EXAM LIMITATIONS: note what portions of the physical exam could not be performed remotely and how you addressed these limitations (e.g., 'unable to perform manual palpation — assessed through patient self-palpation under my guidance; referred to in-person evaluation for hands-on examination'); 5) EMERGENCY PROTOCOL: document that the patient knows what to do in an emergency during the telehealth session; 6) PATIENT IDENTITY VERIFICATION: confirm patient identity at the start of each telehealth session. PRC/PAPT guidelines for telehealth PT documentation were developed during the COVID-19 pandemic and continue to be refined.

ETHICS

109. The 'principle of respect for autonomy' in end-of-life PT care means:

A. Always providing maximum physical rehabilitation regardless of patient wishes

B. HONORING THE PATIENT'S INFORMED PREFERENCES about the goals and extent of rehabilitation — including the right to DECLINE intensive rehabilitation or choose PALLIATIVE-focused goals (comfort, dignity, quality of remaining life) over restorative goals

C. Ignoring patient preferences in crisis

D. The family always decides

✓ Answer: B

💡 Rationale & Explanation:

Patient autonomy at end of life in PT: as a patient approaches end of life (advanced cancer, end-stage heart failure, advanced dementia, terminal COPD), the rehabilitation goals MUST ALIGN WITH THE PATIENT'S INFORMED CHOICES: RESTORATIVE GOALS (maximizing function) are appropriate only if the patient desires and can benefit. PALLIATIVE GOALS (comfort, symptom management, maintaining meaningful function for as long as possible, supporting caregiver) are appropriate when the patient has chosen a palliative approach.

HOSPICE CONTEXT: PT in hospice focuses on: comfort positioning, preventing pressure injuries, supporting transfers to maintain some independence, pain and dyspnea management through positioning and gentle exercise, equipment for comfort and function. THE PT'S ROLE: help the patient and family understand what is realistically achievable; explore their goals and values; design a PT program that honors those goals; advocate within the team for the patient's expressed preferences; support appropriate advance care planning. Forcing intensive rehabilitation on a palliative patient who wants only comfort violates their autonomy.

├— PROFESSIONAL PRACTICE

110. The 'duty to refer' in PT practice means:

A. PTs should refer all patients to physicians

B. When a patient's condition is BEYOND THE COMPETENCE OF THE PT, requires MEDICAL DIAGNOSIS, shows RED FLAGS for serious pathology, or requires SPECIALIST INTERVENTION, the PT has a PROFESSIONAL OBLIGATION to make an appropriate referral — even if this means ending the PT episode

C. PTs should never refer patients

D. Referrals are optional

✓ Answer: B

💡 **Rationale & Explanation:**

PT duty to refer: failing to refer when clinically indicated is a form of negligence. SITUATIONS REQUIRING REFERRAL: RED FLAG SYMPTOMS: unexplained weight loss, constant pain at rest/night, fever with musculoskeletal pain, bladder/bowel dysfunction (cauda equina), new onset severe headache (possible subarachnoid hemorrhage), chest pain/dyspnea during PT (cardiac/pulmonary emergency); BEYOND PT SCOPE: diagnosis requiring imaging, medication, or surgical intervention; INADEQUATE RESPONSE TO PT: if a patient is not improving after 6-8 sessions of evidence-based PT, reconsider the

diagnosis and refer for further medical evaluation; SPECIALIST PT: refer to a PT specialist (pelvic floor, vestibular, oncological rehabilitation) when the condition requires subspecialty expertise you don't have. DOCUMENTATION: document the reason for referral, who you referred to, and the patient's response. FOLLOW UP: communicate with the receiving provider and follow up on the patient's status. The duty to refer is both an ethical and legal obligation in PT.

├─ RESEARCH & EBP

111. A 'sensitivity analysis' in a meta-analysis is performed to:

A. Increase sample size

B. Test the ROBUSTNESS of the pooled results by systematically EXCLUDING STUDIES based on pre-defined criteria (high-risk-of-bias studies, outlier studies) to see if the overall conclusion changes substantially — if results remain similar after exclusion = ROBUST conclusion; if results change significantly = the conclusion is heavily influenced by specific studies

C. Replace individual study data

D. Add more studies

✓ Answer: B

💡 Rationale & Explanation:

Sensitivity analysis in meta-analysis: WHEN PERFORMED: after the primary meta-analysis is complete. HOW: re-run the meta-analysis EXCLUDING specific studies based on: HIGH RISK OF BIAS (e.g., remove studies with high RoB and see if the pooled effect changes); OUTLIERS (extreme effect sizes); UNPUBLISHED STUDIES; SPECIFIC STUDY TYPES (e.g., exclude pilot studies). INTERPRETATION: If the pooled effect remains similar AND statistically significant after removing high-RoB studies → the conclusion is ROBUST (the result is not driven by poor quality studies). If the effect disappears when high-RoB studies are excluded → the evidence is primarily from poor-quality studies → the conclusion should be stated with LOWER CONFIDENCE. WHY IT

MATTERS FOR PT: if a PT guideline is based on a meta-analysis that only maintained significance because of high-RoB studies, the recommendation should be weaker than if the evidence survives sensitivity analysis. Reading meta-analyses critically — including the sensitivity analysis section — is an important EBP skill.

├─ PROFESSIONAL PRACTICE

112. 'Telehealth' PT using videoconference in the Philippines is currently limited by:

A. Physician opposition only

B. INFRASTRUCTURE GAPS (internet access in rural and low-income areas), PATIENT DIGITAL LITERACY (elderly patients, less educated populations), REGULATORY FRAMEWORK (not yet fully established by PRC for PT), and PHYSICAL EXAMINATION LIMITATIONS (unable to perform hands-on assessment) — though rapidly improving with post-COVID-19 acceleration

C. All evidence being negative

D. All Philippine patients having smartphones

✓ Answer: B

💡 **Rationale & Explanation:**

Telehealth PT barriers in the Philippines: INFRASTRUCTURE: only 60-70% of Filipinos have smartphone/internet access; rural areas often have poor connectivity (slow, unstable internet limits video quality); most reliable in urban centers (NCR, Metro Cebu, Metro Davao). DIGITAL LITERACY: elderly patients (who have highest rehabilitation needs) often struggle with technology; family assistance required for some patients. REGULATORY GAPS: PRC has issued guidance on telehealth generally but PT-specific telehealth regulations are still developing; PT licensure jurisdiction (can a PT in Manila treat a patient in Mindanao via telehealth?) is not yet definitively resolved. CLINICAL LIMITATIONS: PT heavily relies on hands-on examination and treatment; telehealth is most appropriate for: exercise instruction and

progression, education, adherence monitoring, functional movement assessment via video — but not for manual therapy, detailed palpation, or physical modality treatment. ENABLERS: COVID-19 acceleration; growing evidence base; PhilHealth considering telehealth reimbursement; PAPT developing telehealth clinical guidelines.

ETHICS

113. 'Social determinants of health' are relevant to PT ethics because:

A. PT practice is purely biomedical

B. POVERTY, EDUCATION LEVEL, HOUSING, FOOD SECURITY, TRANSPORTATION ACCESS, AND EMPLOYMENT affect patients' ability to: access PT services, adhere to home exercise programs, purchase assistive devices, and achieve rehabilitation goals — IGNORING these factors in PT planning is ethically problematic; the ethical PT recognizes and addresses social determinants in their treatment planning

C. Only physicians address social issues

D. Social factors do not affect rehabilitation outcomes

✓ Answer: B

💡 Rationale & Explanation:

Social determinants and PT ethics: the WHO identifies social determinants of health as: income and social protection; education; unemployment and job insecurity; working life conditions; food insecurity; housing and environment; health systems; social inclusion; conflict. HOW THEY AFFECT PT: A patient in poverty: cannot afford therapy copayments → drops out; cannot afford home exercise equipment → limited home program; lives in a home with stairs but cannot afford wheelchair ramp → discharge planning fails. An uneducated patient: may misunderstand home exercises → non-compliance (not willful but comprehension-based). A patient in rural Philippines: no transportation to PT clinic → must use telehealth or CBR. ETHICAL PT RESPONSE: SCREEN for social determinants (ask

about barriers to care); ADAPT the treatment plan (free home exercise programs using household items; simplified education; community health worker follow-up); ADVOCATE for accessible PT services; COLLABORATE with medical social workers; REFER to social support services when available. Ignoring social determinants reduces PT effectiveness and reinforces health inequity.

├─ RESEARCH & EBP

114. The 'CONSORT statement' (Consolidated Standards of Reporting Trials) is a checklist used by:

A. Ethics committees

B. JOURNAL EDITORS AND REVIEWERS to evaluate whether a published RANDOMIZED CONTROLLED TRIAL has reported all essential methodological information transparently — CONSORT 2010 has 25 items covering: sequence generation, allocation concealment, blinding, outcomes, statistical methods, participant flow (CONSORT flow diagram), and discussion of limitations

C. Research participants

D. PT students only

✓ Answer: B

💡 **Rationale & Explanation:**

CONSORT 2010 for RCT reporting: the CONSORT checklist (25 items) ensures transparent, complete reporting of RCTs. KEY ITEMS: TITLE: identify as RCT; ABSTRACT: structured summary including trial design; INTRODUCTION: scientific background, rationale; METHODS: participants (eligibility criteria), interventions (precisely describe), outcomes (pre-specified primary and secondary), sample size calculation, RANDOMIZATION (sequence generation, allocation concealment, implementation), BLINDING; RESULTS: participant FLOW DIAGRAM (showing randomization, allocation, follow-up, analysis), baseline characteristics, outcome data, ancillary analyses, harms; DISCUSSION: interpretation, generalizability, limitations. CONSORT

FLOW DIAGRAM: shows how many participants were screened, enrolled, randomized, received treatment, followed up, and analyzed — critical for assessing internal validity and ITT compliance. IN CRITICAL APPRAISAL: if a PT RCT is missing key CONSORT elements (e.g., no allocation concealment description), the risk of bias is increased → lower quality evidence. Philippine PT researchers submitting to indexed journals must comply with CONSORT for RCT manuscripts.

├─ HEALTHCARE ADMINISTRATION

115. 'Key Performance Indicators' (KPIs) for a PT outpatient department include all of the following EXCEPT:

A. Average patient improvement on validated outcome measures

B. Patient satisfaction scores (HCAHPS-adapted for PT)

C. Number of prescriptions written by the PT

D. Wait time from referral to first appointment

✓ Answer: C

💡 Rationale & Explanation:

PT department KPIs: KPIs commonly used to measure PT department performance: CLINICAL OUTCOMES: % of patients achieving goals; average functional improvement (FIM, WOMAC, ODI, etc.); re-admission rates; fall incidence during PT. PATIENT EXPERIENCE: patient satisfaction scores (adapted consumer assessment surveys); complaints and compliments; wait time from referral to initial assessment; cancellation rates. OPERATIONAL EFFICIENCY: average length of treatment episode; patients seen per PT per day; revenue per patient visit; documentation compliance rate. QUALITY INDICATORS: adherence to clinical guidelines; CPD compliance of staff; incident/adverse event rates. PRESCRIPTIONS WRITTEN: PTs DO NOT PRESCRIBE MEDICATIONS — this is NOT a PT KPI. It would be a medical KPI. Including a prescription metric for PT would represent a scope-of-practice violation. In Philippine PT quality assurance: department

heads should select KPIs that reflect BOTH efficiency AND quality of care — not only productivity metrics. Overcorrection toward pure productivity KPIs (units/day) at the expense of outcome and satisfaction KPIs leads to poor quality care despite appearing 'productive' on paper.

ETHICS

116. The 'RA 10173 Data Privacy Act' specifically requires PT clinics to have:

A. No specific requirements for small clinics

B. A designated DATA PROTECTION OFFICER (DPO) for covered entities; a PRIVACY NOTICE for patients explaining how their data is collected, stored, and used; SECURITY MEASURES for health data protection; procedures for DATA BREACH NOTIFICATION; and compliance with DATA SUBJECT RIGHTS (access, correction, erasure, portability)

C. Only password-protected computers

D. Only paper records storage

✓ Answer: B

💡 **Rationale & Explanation:**

Data Privacy Act (RA 10173) compliance for PT clinics: ALL entities handling personal information (which includes health data — 'sensitive personal information') must comply. REQUIREMENTS: 1) DATA PROTECTION OFFICER (DPO): required for personal information CONTROLLERS and PROCESSORS with significant data processing; clinics above the threshold should designate a DPO; 2) PRIVACY NOTICE: inform patients at the time of data collection what data is collected, why, how long it's kept, and who it may be shared with; 3) SECURITY MEASURES: access controls, encryption (for digital data), secure physical storage (for paper records), staff training on data privacy; 4) DATA BREACH NOTIFICATION: within 72 hours of discovering a breach involving sensitive personal information → report to the National Privacy Commission AND notify affected individuals; 5) DATA

SUBJECT RIGHTS: patients can request: access to their records; correction of errors; erasure under certain circumstances; portability of data. NATIONAL PRIVACY COMMISSION (NPC): the regulatory body in the Philippines for data privacy. PT clinics that store ELECTRONIC HEALTH RECORDS need proper cybersecurity measures. Non-compliance: administrative penalties of up to Php 5 million and possible criminal penalties for serious violations.

├— PROFESSIONAL PRACTICE

117. The 'evidence-informed practice' concept (as opposed to strict 'evidence-BASED practice') acknowledges that:

A. Only RCTs should guide PT decisions

B. CLINICAL EXPERTISE, PATIENT VALUES, and contextual FACTORS (resource availability, cultural relevance, practical feasibility) must be integrated with the best available evidence — pure evidence-based practice dogmatically applied to every patient is not always appropriate or possible

C. Evidence can be completely ignored

D. Clinical experience alone is sufficient

✓ Answer: B

💡 Rationale & Explanation:

Evidence-informed vs. evidence-based practice: STRICT EBP: apply the findings of the highest-quality evidence to every clinical decision. LIMITATIONS of strict EBP: the best evidence may not exist for your specific patient population (e.g., elderly Filipino with multiple comorbidities vs. young Western athlete in the RCT); the setting (rural Philippine health center) may not support the evidence-based intervention (requires specialized equipment, trained staff, multiple sessions per week); the patient's values may differ from those assumed by the evidence. EVIDENCE-INFORMED PRACTICE: uses the SAME THREE PILLARS as EBP (best evidence + clinical expertise + patient values) but explicitly acknowledges that: clinical expertise

matters when evidence is absent or indirect; patient preferences are not just 'considered' but CENTRAL; feasibility in the specific context must be assessed. This is the MORE MATURE, REALISTIC approach to applying research in the real world of Philippine PT practice — not a license to ignore evidence, but an acknowledgment of its limitations and the importance of judgment.

├─ RESEARCH & EBP

118. A PT reads a study claiming 'treatment A reduces pain by 50%' without specifying a comparator. This is an example of:

A. Clear evidence

B. MISLEADING REPORTING — relative risk reduction (RRR) without the ABSOLUTE RISK REDUCTION (ARR) or BASELINE RISK is insufficient for clinical decision-making; 50% reduction from 2/10 to 1/10 on the NRS is very different from 50% reduction from 8/10 to 4/10

C. Strong evidence

D. Invalid research

✓ Answer: B

💡 Rationale & Explanation:

Relative vs. absolute risk reduction: RELATIVE RISK REDUCTION (RRR): the proportional reduction from baseline — 50% sounds impressive but without knowing the BASELINE EFFECT, it is meaningless. ABSOLUTE RISK REDUCTION (ARR): the actual difference in outcomes between treatment and control — a 50% RRR from a very small absolute baseline effect is clinically unimportant. NUMBER NEEDED TO TREAT (NNT) = 1/ARR: the most clinically useful metric — how many patients must receive treatment for one to benefit? EXAMPLE: Drug reduces stroke risk from 2% to 1%: RRR = 50% (impressive sounding!); ARR = 1%; NNT = 100 (need to treat 100 patients for one to benefit — less impressive). In PAIN RESEARCH: a 50% reduction in pain scores from 4/10 to 2/10 is both a 50% RRR and a 2-point ARR — is this clinically meaningful? MCID for pain: ~15-20mm on a 100mm VAS. So:

4/10 to 2/10 = 20mm reduction = at or slightly above the MCID. With all three metrics (RRR + ARR + MCID), you can make a sound clinical decision. This statistical literacy is a key EBP competency for Philippine PT board examination candidates.

├— PROFESSIONAL PRACTICE

119. The 'Philippine Human Resource for Health' (HRH) Master Plan includes PT because:

A. PT is not part of HRH planning

B. PTs are CRITICAL MEMBERS of the HEALTH WORKFORCE — the HRH Master Plan addresses the training, deployment, and retention of all health professionals including PTs; current challenges: SHORTAGE of PTs in rural areas and public health facilities; MALDISTRIBUTION (concentration in urban areas); PT-to-population ratio significantly lower than WHO recommendations

C. Only nurses are included in HRH

D. PT is over-supplied in all regions

✓ Answer: B

💡 Rationale & Explanation:

HRH Master Plan and PT in the Philippines: The Department of Health (DOH) HRH Master Plan addresses workforce planning for all health professions. PT SITUATION IN THE PHILIPPINES: PT-to-population ratio: approximately 1 PT per 20,000-30,000 population in the Philippines (far below the WHO-suggested standard); GEOGRAPHIC MALDISTRIBUTION: most PTs practice in urban areas (NCR, Cebu, Davao) — rural and remote areas, which have the highest burden of disability and non-communicable diseases, have critically inadequate PT services. CHALLENGES: PT education is primarily in urban institutions → graduates tend to practice near training institutions; PT services are not prioritized in public health budgets; career development opportunities are limited in rural settings. SOLUTIONS being advocated: deployment incentives for rural PT practice;

integration of PT into primary care; community-based rehabilitation (CBR) programs; task-shifting with proper training (PT assistants, barangay health workers trained by PTs); telemedicine to extend PT reach; PAPT advocacy for rural PT deployment programs.

ETHICS

120. The 'principle of double effect' applied to a PT scenario: a PT knows that aggressive stretching of a contracture will cause significant pain during the session but will produce substantially improved function for the patient. This is ethically justifiable IF:

A. Pain is always unjustifiable

B. ALL FOUR CONDITIONS ARE MET: 1) The action itself (stretching) is not intrinsically wrong; 2) The PT's intention is the good outcome (improved function), not the harm (pain); 3) The pain is a foreseen but UNINTENDED SIDE EFFECT, not the means to the good; 4) The good (improved function, reduced disability) proportionately outweighs the harm (temporary significant pain) — AND the patient has given INFORMED CONSENT

C. Pain is always necessary for improvement

D. No ethical analysis is needed

✓ Answer: B

💡 **Rationale & Explanation:**

Double effect in PT practice: applying the 4 conditions to aggressive stretching: 1) INTRINSICALLY PERMISSIBLE: therapeutic stretching is an accepted PT intervention — not intrinsically wrong; 2) GOOD INTENTION: the PT aims to restore function, not to cause pain — pain is an unfortunate side effect, not the goal; 3) PAIN AS SIDE EFFECT, NOT MEANS: the improved range of motion is achieved by the physical elongation of tissue — the pain itself does not produce the benefit (compare: hurting the patient to 'teach them a lesson' = pain IS the means = NOT justifiable); 4) PROPORTIONALITY: the functional gain (ability to walk, dress independently, return to work) must outweigh

the short-term pain burden — requires clinical judgment; for minor functional gains, aggressive painful stretching may not be proportionate. INFORMED CONSENT: critical — the patient must be told: the procedure will be painful; the expected benefit; the alternatives (less aggressive stretching with slower progress). A patient who understands and agrees demonstrates the proportionality judgment is reasonable. Document the discussion and consent.

├— PHILIPPINE PT LAW

142. RA 10210 Section 30 (Penal Clause): practicing PT without a license is:

A. A minor administrative violation

B. A CRIMINAL OFFENSE — violation of RA 10210 and the PRC Act; penalties include FINE and/or IMPRISONMENT; this also applies to facilities that employ or allow unlicensed individuals to practice PT

C. A civil violation only

D. Not regulated

✓ Answer: B

💡 **Rationale & Explanation:**

Unlicensed PT practice in the Philippines: RA 10210 SECTION 30: any person who practices physical therapy in the Philippines without a valid Certificate of Registration and Professional Identification Card; OR allows another person to practice PT using their license; OR falsely claims to be a registered PT: SHALL BE PUNISHED BY FINE AND/OR IMPRISONMENT as prescribed by the law. ENFORCEMENT: PRC, PBPT, and law enforcement share responsibility. WHO IS AT RISK: individuals offering PT services without a license; massage therapists marketing 'physical therapy' services beyond their scope. PT OBLIGATION: report known unlicensed PT practice to PBPT/PRC or PAPT.

ETHICS

143. 'Beneficent paternalism' in healthcare means:

A. Always doing what the patient wants

B. OVERRIDING a patient's expressed preference because the provider believes they know better — MODERN ETHICS REJECTS paternalism for capacitated adults, favoring patient autonomy, EXCEPT when the patient demonstrably lacks decision-making capacity

C. Providing extra care for free

D. Treating family members for free

✓ Answer: B

💡 Rationale & Explanation:

Beneficent paternalism: the belief the clinician can and should make decisions for patients 'for their own good' — even when the patient disagrees. HISTORICAL: dominant in 20th-century medicine ('doctor knows best'). MODERN POSITION: paternalism is ethically UNJUSTIFIED for capacitated adults — violates AUTONOMY. JUSTIFIED EXCEPTIONS: true lack of capacity (unconscious, severe cognitive impairment, acute psychosis); even then, surrogate decisions are preferred. SOFT PATERNALISM: nudging toward healthier choices through option framing (acceptable if not coercive). IN PT: insisting a patient 'must' do exercises they refuse = paternalistic; the ethical approach = inform, understand their perspective, explore alternatives, ultimately RESPECT their autonomous decision.

RESEARCH & EBP

144. A 'systematic review without meta-analysis' differs from one with meta-analysis because:

A. Both are equally rigorous

B. The meta-analysis STATISTICALLY POOLS individual study data into a single effect size estimate — possible only when studies are sufficiently homogeneous; qualitative synthesis summarizes findings narratively when pooling is inappropriate due to clinical or statistical heterogeneity (I^2 >75%)

C. Meta-analysis is always preferred

D. Qualitative synthesis lacks rigor

✓ Answer: B

💡 **Rationale & Explanation:**

Meta-analysis vs. qualitative synthesis: META-ANALYSIS: statistically combines quantitative data → pooled effect size with CI; increases power; uses forest plots. APPROPRIATE when: studies are clinically homogeneous; statistical heterogeneity is low (I^2 <75%); data in compatible formats. NOT APPROPRIATE when: studies too diverse; heterogeneity too high (would produce misleading average). I^2 statistic: <25% = low, 25-75% = moderate, >75% = high heterogeneity. High heterogeneity with meta-analysis = potentially misleading pooled estimate. QUALITATIVE SYNTHESIS: narrative summary; describes patterns; appropriate when too heterogeneous to pool. Both are legitimate — methodological appropriateness determines which to use.

├─ PROFESSIONAL PRACTICE

145. The PRC CPE/CPD requirement for Philippine PT license renewal is:

A. 10 units per year

B. 45 UNITS PER 3-YEAR CYCLE — submitted to the PRC at license renewal; categories include: formal education (seminars, workshops, conferences), self-directed learning, professional service, and research/publications

C. 100 units per year

D. No continuing education required

✓ **Answer: B**

💡 **Rationale & Explanation:**

Philippine PT CPE/CPD: PRC requires 45 units per 3-year period for license renewal. CPE CATEGORIES: Category A = post-graduate formal education (conferences, seminars, workshops — typically 1 unit/hour); Category B = self-directed learning (reading, online courses); Category C = professional service (committee work, teaching); Category D = research and publications. DOCUMENTATION: keep certificates and receipts; submit at license renewal. PAPT: accredits CPE providers; annual national conference is a major CPE source. Maintaining CPE records throughout the 3-year period avoids last-minute rush to accumulate units.

├─ RESEARCH & EBP

146. 'Triangulation' in mixed-methods research means:

A. A geometric measurement technique

B. Using MULTIPLE DATA SOURCES, METHODS, OR THEORIES to gain a more complete and valid understanding — e.g., combining quantitative (RCT measuring pain scores) with qualitative (interviews exploring patient experience) to provide a richer picture

C. Randomization from three groups

D. A three-point scale

✓ **Answer: B**

💡 **Rationale & Explanation:**

Triangulation types: METHODS TRIANGULATION: different data collection methods (survey + interviews) for the same question. DATA TRIANGULATION: different data sources (patients + caregivers + PT notes). INVESTIGATOR TRIANGULATION: multiple researchers independently analyze data then compare findings. THEORY TRIANGULATION: multiple frameworks applied to interpret the same data. EXAMPLE in PT: understanding poor exercise adherence —

quantitative: measure adherence rates via accelerometers; qualitative: interview patients about barriers. If both show time constraints are the main barrier → CONVERGENT VALIDITY; if they diverge → deeper investigation needed. Mixed-methods research captures both statistical outcomes AND human experience of rehabilitation.

├— ETHICS

147. The 'right to information' in the Philippines is protected by:

A. No specific law

B. DATA PRIVACY ACT (RA 10173 — access to own health data), the CONSUMER ACT, and general INFORMED CONSENT principles — patients have the right to receive accurate, complete information about their diagnosis, treatment options, risks, benefits, and prognosis in understandable language

C. Only international treaties

D. The Philippine Medical Act only

✓ Answer: B

💡 **Rationale & Explanation:**

Patient right to information: RA 10173 (Data Privacy Act): patients have the right to access, correct, and receive copies of their personal health data. CONSUMER ACT (RA 7394): protects healthcare consumers including the right to accurate information. INFORMED CONSENT LAW: full disclosure before agreeing to treatment. DOH PATIENT'S BILL OF RIGHTS: reinforces information rights. LINGUISTIC ACCESSIBILITY: information must be provided in a LANGUAGE THE PATIENT UNDERSTANDS — plain language; Filipino or local dialect when needed. PT IMPLICATIONS: use plain language; verify understanding (ask patient to explain back); provide written summaries; document what was communicated and when.

PROFESSIONAL PRACTICE

148. The PT 'professional seal' in the Philippines:

A. Is optional

B. Is a LEGAL REQUIREMENT for official PT documents — the seal shows the PT's name, PRC registration number, and 'Registered Physical Therapist'; it is affixed along with the PT's signature on clinical documents they are professionally responsible for

C. Only used in hospitals

D. Only used for research publications

✓ Answer: B

💡 Rationale & Explanation:

PT professional seal: PRC regulations require registered professionals to use their OFFICIAL SEAL on documents representing their professional work. FOR PTs: seal includes full name, title (RPT), PRC registration number, PTR number. REQUIRED ON: evaluation reports, progress notes, medical certificates, referral letters, research publications, and other official PT documents. LEGAL SIGNIFICANCE: affixing the seal certifies the PT's professional responsibility for the document's content. NEVER seal documents you did not prepare or care you did not provide. The seal + signature combination creates the legally binding professional certification of clinical work.

RESEARCH & EBP

149. 'Concurrent validity' means:

A. The test gives the same result twice

B. The NEW ASSESSMENT TOOL correlates highly with an already VALIDATED GOLD STANDARD measure for the same construct — establishing that the new tool measures what it claims to measure when both are administered at the same time

C. The test predicts future outcomes

D. Inter-rater agreement

✓ **Answer: B**

💡 **Rationale & Explanation:**

Concurrent validity: a type of CRITERION VALIDITY. CONCURRENT: both the new test and the gold standard administered at the SAME TIME (concurrently). HIGH CORRELATION = good concurrent validity. EXAMPLE: validating the 30-second chair stand as a measure of LE strength — correlate it with isokinetic quadriceps strength testing in the same session; high correlation (r >0.70-0.80) = concurrent validity confirmed. Compare PREDICTIVE VALIDITY: new test administered now, gold standard measured later. CLINICAL RELEVANCE: when adopting a new outcome measure, verify it has been validated concurrently against an existing gold standard in your specific patient population.

├─ HEALTHCARE ADMINISTRATION

150. 'Productivity standard' of 40-50 units per day in inpatient PT means:

A. Number of patients seen

B. Number of 15-MINUTE BILLING UNITS of direct patient care — 40 units = 10 hours of direct care; creates tension with documentation time, patient preparation, and team meetings; ethical tension between institutional productivity demands and quality care

C. Number of exercises prescribed

D. Daily step count

✓ **Answer: B**

💡 **Rationale & Explanation:**

PT productivity metrics: BILLING UNITS: 15-minute increments (one 'unit' = one 15-minute period of direct care). A standard of 40 units = 10 hours of direct patient care per day — not realistic in most settings (documentation, preparation, and communication also take time). CONSEQUENCES OF HIGH STANDARDS: rushed documentation; less

time for patient education and caregiver training; pressure to see patients when not clinically ready. ETHICAL TENSION: PT's duty to provide quality care vs. institutional productivity demands. ADVOCACY: PT professionals should advocate for ADEQUATE TIME PER PATIENT — quality cannot be maintained with excessively high patient loads. Document concerns when ratios are unsafe.

ETHICS

151. 'Moral residue' in healthcare ethics refers to:

A. Ethical clarity after difficult decisions

B. The PERSISTENT PSYCHOLOGICAL AND ETHICAL DISCOMFORT that remains after a clinician has made a difficult ethical decision — even when they believe they made the right choice, the weight of the moral compromise persists

C. The list of ethical principles

D. Conflict resolution outcome

✓ Answer: B

💡 Rationale & Explanation:

Moral residue (Jameton, Webster and Baylis): when a PT faces MORAL DISTRESS and makes the 'least bad' available choice: even after making what they believe is the best possible decision, a feeling of MORAL DISCOMFORT persists. Example: discharging a patient prematurely due to insurance refusal; doing everything possible (thorough home program, community PT referral, family training) but still feeling the weight of the inadequate outcome. MANAGEMENT: institutional support structures (ethics committees, peer support); reflective practice (journaling, supervision); peer debriefing; recognizing moral residue is NORMAL — it indicates the PT CARES about their patients; advocacy to prevent recurrence. Unaddressed cumulative moral residue leads to MORAL BURNOUT and COMPASSION FATIGUE.

RESEARCH & EBP

152. 'External validity' (generalizability) of a clinical study refers to:

A. Statistical significance

B. The degree to which the study's FINDINGS CAN BE GENERALIZED to populations and settings outside the study — determined by how representative the sample and setting are of the target clinical population

C. Internal consistency

D. Blinding procedures

✓ Answer: B

💡 Rationale & Explanation:

External validity: HIGH external validity: study population closely resembles the clinical population you treat; intervention delivered as you would use it; setting similar to your practice. LOW external validity: highly selected sample (exclude elderly, comorbid patients); perfect protocol adherence; unusually skilled therapists. PHILIPPINE CONTEXT: most high-quality PT RCTs are conducted in North America, Europe, or Australia; their populations, healthcare systems, and resource levels differ from the Philippine context. BEFORE APPLYING evidence: assess whether the study population resembles your patients; whether the intervention is feasible in your setting; whether outcomes are relevant to your patients' goals. This is 'contextually appropriate EBP.'

PROFESSIONAL PRACTICE

153. The PAPT Code of Ethics requires members to:

A. Prioritize PAPT membership fees

B. MAINTAIN PROFESSIONAL COMPETENCE, PLACE PATIENT WELFARE FIRST, UPHOLD THE DIGNITY OF THE PROFESSION, COLLABORATE

WITH COLLEAGUES, and ADVANCE THE SCIENCE OF PHYSICAL THERAPY — aligned with World Physiotherapy ethical principles

C. Only follow government orders

D. Avoid professional development after graduation

✓ Answer: B

💡 **Rationale & Explanation:**

PAPT Code of Ethics principles: 1) PATIENT WELFARE: primary responsibility to the patient — all clinical decisions prioritize health and wellbeing; 2) PROFESSIONAL COMPETENCE: ongoing education, staying current, recognizing limits, seeking consultation; 3) PROFESSIONAL INTEGRITY: honesty, transparency, avoiding conflicts of interest; 4) RESPECT FOR PERSONS: dignity, privacy, confidentiality, cultural sensitivity; 5) PROFESSIONAL RESPONSIBILITIES: teaching, research, advocacy; 6) SOCIETAL RESPONSIBILITIES: public health, equitable access; 7) COLLEGIAL RELATIONSHIPS: respectful, collaborative interactions with colleagues and other health professionals.

├─ HEALTHCARE ADMINISTRATION

154. The 'Lean healthcare' principle most directly aimed at REDUCING PATIENT WAIT TIMES is:

A. 5S organization

B. VALUE STREAM MAPPING — systematically documenting and analyzing every step in the patient's journey through the PT service to identify BOTTLENECKS, UNNECESSARY DELAYS, and INEFFICIENCIES (waste) that increase waiting time

C. Staff scheduling

D. Equipment maintenance

✓ Answer: B

💡 **Rationale & Explanation:**

Value stream mapping (VSM) in lean PT: VSM traces every step from REFERRAL RECEIPT through ASSESSMENT, TREATMENT, and DISCHARGE. Documents: time spent at each step, waiting time between steps, handoff processes. IDENTIFIES WASTE: excessive time waiting for scheduling, paperwork delays, time between referral and first appointment, inefficient documentation processes. IMPROVEMENTS targeting VSM-identified bottlenecks: standardized intake forms; online scheduling; same-day assessment for urgent referrals; improved referral communication. BENEFIT: VSM-driven improvements in PT departments consistently show reduced wait times, improved patient satisfaction, and better clinical outcomes from earlier intervention.

ETHICS

155. The 'duty to warn' (Tarasoff principle) applies to PT when:

A. A patient discusses financial problems

B. A PATIENT MAKES A SPECIFIC, CREDIBLE THREAT TO HARM AN IDENTIFIABLE PERSON — the PT has an ethical (and potentially legal) duty to warn the potential victim or inform appropriate authorities, which overrides the duty of confidentiality in this exceptional case

C. A patient expresses frustration

D. A patient is non-compliant

✓ Answer: B

💡 Rationale & Explanation:

Tarasoff duty to warn: healthcare providers have a duty to protect identifiable third parties from specific, credible threats. APPLICABLE IN PT when: specific (not vague frustration), credible (serious intent), against an identifiable target. ACTIONS: warn the potential victim, inform law enforcement, or take other reasonable protective actions — even if this breaches confidentiality. PHILIPPINE CONTEXT: no specific Tarasoff-equivalent legislation; but the Civil Code's general duty of care and healthcare ethics principles support a duty to warn.

When in doubt: consult with a supervisor, institutional ethics committee, or legal counsel; document all communications.

PROFESSIONAL PRACTICE

156. Under RA 10210, the 'Philippine Board of Physical Therapy' (PBPT) has how many members?

A. 3

B. 5 — a chairman and 4 regular members, all appointed by the President of the Philippines upon recommendation of the PRC and PAPT

C. 7

D. 10

✓ Answer: B

💡 Rationale & Explanation:

PBPT composition under RA 10210: FIVE (5) MEMBERS: 1 CHAIRMAN + 4 REGULAR MEMBERS, all appointed by the PRESIDENT OF THE PHILIPPINES upon recommendation of the PRC, with support of the accredited professional organization (PAPT). QUALIFICATIONS: Filipino citizen, good moral character, registered PT with ≥10 years practice, not an officer of any school offering PT programs. TERM: 3 years, staggered terms. FUNCTIONS: administers the PT licensure examination; prepares board exam questions; enforces RA 10210; issues/revokes licenses. This governance structure is similar to other PRC-regulated professions in the Philippines.

RESEARCH & EBP

157. The 'GRADE approach' rates the quality of evidence as HIGH when:

A. Only one RCT supports it

B. FURTHER RESEARCH IS VERY UNLIKELY to change confidence in the effect estimate — typically supported by multiple high-quality RCTs with consistent results, low heterogeneity, directly applicable to the clinical question, and precise estimates (narrow CIs)

C. Any observational study supports it

D. Expert consensus alone supports it

✓ **Answer: B**

💡 **Rationale & Explanation:**

GRADE quality levels: HIGH: further research very unlikely to change confidence (multiple consistent, directly applicable RCTs with precise estimates). MODERATE: further research likely to have important impact. LOW: further research very likely to have important impact. VERY LOW: very uncertain about the estimate. GRADE also considers: risk of bias, inconsistency (heterogeneity), indirectness, imprecision, publication bias — each can DOWNGRADE the evidence quality. RCTs start HIGH; observational studies start LOW. CLINICAL DECISION: when GRADE quality is HIGH, recommendations can be made with confidence; when LOW or VERY LOW, greater uncertainty = conditional/weak recommendations.

├— HEALTHCARE ADMINISTRATION

158. Philippine 'PhilHealth' coverage of PT services currently:

A. Covers unlimited PT sessions

B. Covers PT as part of CASE RATE PACKAGES for specific conditions (stroke, TBI, SCI, burns rehabilitation) and PRIMARY CARE BENEFIT packages — PT-accredited clinics and hospitals can provide covered PT services to PhilHealth members

C. Has no PT coverage

D. Only covers surgery

✓ **Answer: B**

💡 **Rationale & Explanation:**

PhilHealth and PT coverage: CASE RATE packages include PT for: STROKE rehabilitation; TBI rehabilitation; SCI rehabilitation; burn rehabilitation; certain orthopedic procedures. PRIMARY CARE BENEFIT: PhilHealth-accredited clinics (including those with PT services) can provide covered consultations and services to members. IMPLICATIONS FOR PT: ensure your practice is PROPERLY ACCREDITED with PhilHealth; correct documentation and billing codes must be used; coverage helps bridge the gap between expensive PT and accessibility for lower-income patients. PAPT ADVOCACY: expanding PhilHealth coverage to include more musculoskeletal and chronic disease PT is an ongoing advocacy priority.

ETHICS

159. The 'sliding scale' of decision-making capacity means:

A. Patients pay for different levels of care

B. MORE COMPLEX, HIGHER-RISK decisions require a HIGHER STANDARD of demonstrated capacity — a patient refusing a low-risk intervention needs to demonstrate less capacity than one refusing a life-saving procedure

C. Capacity is based on age

D. All decisions require the same level of capacity

✓ Answer: B

💡 Rationale & Explanation:

Sliding scale of capacity (Drane, Buchanan & Brock): LOW-STAKES decision: patient needs only basic understanding and expressed preference. MODERATE-STAKES decision: ensure the patient truly understands the consequences of refusal. HIGH-STAKES decision (e.g., refusing life-saving rehabilitation): be more rigorous in assessing capacity — involve the medical team and ethics consultation if uncertain. In PT: a patient refusing a routine exercise → respect their autonomy. A patient refusing life-critical rehabilitation post-MI (unable to care for dependent family without recovery) → verify capacity,

involve the team, document thoroughly. The sliding scale protects autonomy for everyday decisions while ensuring protection for high-stakes, potentially irreversible decisions.

├— PROFESSIONAL PRACTICE

160. The 'PT-to-population ratio' in the Philippines is approximately:

A. 1:5,000

B. 1:20,000-30,000 population — far below WHO-suggested standards; most PTs practice in urban areas (NCR, Cebu, Davao) while rural areas have critically inadequate PT services

C. 1:100

D. 1:500

✓ Answer: B

💡 **Rationale & Explanation:**

HRH and PT in the Philippines: PT-to-population ratio: approximately 1 PT per 20,000-30,000 population in the Philippines. GEOGRAPHIC MALDISTRIBUTION: most PTs practice in urban areas — rural and remote areas, which have the highest burden of disability and non-communicable diseases, have critically inadequate PT services. SOLUTIONS being advocated: deployment incentives for rural PT practice; integration of PT into primary care; CBR programs; task-shifting with proper training; telemedicine to extend PT reach. HRH MASTER PLAN: DOH addresses PT as a CRITICAL HEALTH WORKFORCE MEMBER — training, deployment, and retention planning. PAPT advocacy: rural PT deployment programs, public health PT positions.

├— RESEARCH & EBP

161. The 'CONSORT statement' is used by:

A. Ethics committees only

B. JOURNAL EDITORS AND REVIEWERS to evaluate whether a published RCT has reported all essential methodological information transparently — CONSORT 2010 has 25 items covering sequence generation, allocation concealment, blinding, outcomes, statistical methods, participant flow (CONSORT flow diagram), and discussion of limitations

C. Research participants

D. PT students only

✓ **Answer: B**

💡 **Rationale & Explanation:**

CONSORT 2010: 25-item checklist for transparent, complete RCT reporting. KEY ITEMS: TITLE (identify as RCT); ABSTRACT (structured summary); METHODS (participants, interventions, outcomes, sample size calculation, RANDOMIZATION — sequence generation, allocation concealment, implementation, BLINDING); RESULTS (FLOW DIAGRAM showing randomization → allocation → follow-up → analysis, baseline characteristics, outcome data, harms); DISCUSSION (interpretation, generalizability, limitations). CONSORT FLOW DIAGRAM: essential for assessing internal validity and ITT compliance. Philippine PT researchers submitting to indexed journals must comply with CONSORT for RCT manuscripts.

ETHICS

162. The ethical principle of 'FIDELITY' in PT practice means:

A. Financial loyalty to employer

B. KEEPING COMMITMENTS AND PROMISES — arriving for scheduled sessions, following through on treatment plans, maintaining confidentiality as promised, and fulfilling professional obligations to patients, colleagues, and the profession

C. Working overtime

D. Treating all conditions equally

✓ **Answer: B**

💡 **Rationale & Explanation:**

Fidelity: FAITHFULNESS to commitments and obligations. IN PT PRACTICE: KEEPING SCHEDULED APPOINTMENTS (patients rely on PT sessions for recovery); following through on treatment plans; MAINTAINING CONFIDENTIALITY as promised; fulfilling PROFESSIONAL OBLIGATIONS to the team, institution, and profession; honoring referral commitments. VIOLATIONS: cancelling sessions repeatedly; abandoning care mid-treatment; failing to document as promised; breaking confidentiality. FIDELITY BUILDS TRUST — the foundation of the therapeutic relationship. In team settings: fidelity includes attending MDT meetings, completing assessments by agreed timelines, completing documentation that other team members depend on for decision-making.

├— RESEARCH & EBP

163. The 'PICO framework' for EBP question formulation stands for:

A. Protocol, Intervention, Comparison, Outcome

B. PATIENT/POPULATION, INTERVENTION, COMPARISON, OUTCOME — a structured approach to formulating answerable clinical questions that guide database searches and critical appraisal

C. Procedure, Investigation, Cause, Outcome

D. Pain, Improvement, Clinician, Objective

✓ **Answer: B**

💡 **Rationale & Explanation:**

PICO framework: P = PATIENT/POPULATION (who is the patient, what is their condition — e.g., 'adults with chronic non-specific LBP'); I = INTERVENTION (e.g., 'manual therapy'); C = COMPARISON (e.g., 'exercise therapy alone'); O = OUTCOME (e.g., 'pain reduction, functional improvement at 3 months'). FULL EXAMPLE: 'In adults with chronic non-specific LBP (P), does manual therapy combined with

exercise (I) compared with exercise alone (C) produce greater pain reduction and functional improvement at 3 months (O)?' PICO (or PICOS — S for Study Design) is the foundation of evidence-based practice — guides database search terms, inclusion criteria for systematic reviews, and assessment of whether individual studies answer the clinical question.

├— PROFESSIONAL PRACTICE

164. 'Continuing competence' in PT requires:

A. Only attending the annual PAPT convention

B. Systematically updating clinical knowledge and skills through CPD, self-directed learning, peer consultation, and reflective practice — ensuring that clinical practice remains current with the evolving evidence base throughout a professional career

C. Memorizing old textbooks

D. Only reading government documents

✓ Answer: B

💡 **Rationale & Explanation:**

Continuing competence: broader than just meeting CPE requirements. TRUE CONTINUING COMPETENCE: 1) FORMAL CPD: seminars, workshops, conferences (required for PRC license renewal); 2) INFORMAL LEARNING: reading journals, textbooks, clinical guidelines; 3) REFLECTIVE PRACTICE: systematic review of own clinical outcomes and decision-making; 4) PEER CONSULTATION: discussing complex cases with colleagues; 5) SUPERVISED PRACTICE: seeking mentorship for new skills; 6) SELF-ASSESSMENT: identifying knowledge gaps and addressing them proactively. WHY IT MATTERS: evidence base for PT is constantly evolving — what was standard practice 10 years ago may now be contraindicated. A PT who stopped learning after graduation is not maintaining competence.

HEALTHCARE ADMINISTRATION

165. 'Patient journey mapping' in PT service quality improvement involves:

A. Staff scheduling only

B. Systematically documenting and analyzing every TOUCHPOINT of the patient's experience from REFERRAL through ASSESSMENT, TREATMENT, and DISCHARGE — identifying bottlenecks, delays, communication gaps, and opportunities to improve the patient experience and clinical outcomes

C. Financial audit only

D. Equipment maintenance scheduling

✓ Answer: B

💡 Rationale & Explanation:

Patient journey mapping: traces every step: REFERRAL (how does the patient access PT? wait times? communication with referrer?); INTAKE (reception, paperwork, first impression); ASSESSMENT (wait time, privacy, thoroughness, goal-setting); TREATMENT (session quality, home exercise explanation, progress tracking); DISCHARGE (clear discharge criteria, follow-up plan, self-management support). MAPPING REVEALS: long wait times; poor communication between referrer and PT; patients not understanding their diagnosis or treatment plan; unclear discharge criteria. IMPROVEMENTS targeting touchpoints consistently improve both patient satisfaction AND clinical outcomes. In Philippine PT departments: patient journey mapping has helped redesign outpatient clinic flows and reduce first-appointment waiting times.

ETHICS

166. The 'Declaration of Helsinki' governs:

A. PT licensure examinations

B. Ethical conduct of medical/health RESEARCH involving human subjects — informed consent, right to withdraw, risks vs. benefits, independent ethics committee review, participant privacy protection

C. PT clinical guidelines

D. Hospital administration

✓ Answer: B

💡 **Rationale & Explanation:**

Declaration of Helsinki (WMA, 1964, updated 2013): KEY PRINCIPLES: 1) INFORMED CONSENT: voluntary, free from coercion, adequately informed; 2) RIGHT TO WITHDRAW: any time, without penalty; 3) ETHICS COMMITTEE REVIEW: all research must be approved by an independent IRB/IEC; 4) VULNERABLE POPULATIONS: extra protections for children, prisoners, pregnant women, cognitively impaired; 5) RISKS AND BENEFITS: minimized risks, proportional to expected benefits; 6) PUBLICATION ETHICS: negative results must be published; 7) PRIVACY: participant confidentiality protected. In the Philippines: research involving human subjects requires ETHICAL REVIEW BOARD (ERB) approval AND adherence to the National Ethics Guidelines for Health and Health-Related Research (NEGHHR).

├— RESEARCH & EBP

167. The 'standardized response mean' (SRM) of 0.8 represents:

A. A small effect

B. A LARGE EFFECT — SRM = mean change / SD of change; 0.8 threshold = large effect (Cohen's conventions: small <0.2, medium 0.5, large 0.8); the outcome measure is highly responsive to clinically meaningful change

C. A medium effect

D. No effect

✓ Answer: B

💡 **Rationale & Explanation:**

SRM for responsiveness: SRM = Mean Change / Standard Deviation of Change. INTERPRETATION (Cohen's conventions): <0.2 = small (poorly responsive); 0.5-0.8 = medium; >0.8 = large (highly responsive). SRM 0.8 means: the mean change is 0.8 SDs of the change distribution — LARGE treatment effect for the outcome measure, indicating it is VERY RESPONSIVE to change. SELECTING OUTCOME MEASURES: prefer measures with HIGH SRM in your specific patient population. COMBINE WITH: MDC (tells you if change is real, above measurement error) + MCID (tells you if real change is clinically meaningful). A good outcome measure has: large SRM + small MDC relative to MCID + valid and reliable.

├— PROFESSIONAL PRACTICE

168. Under Philippine law, the medical record is owned by:

A. The patient

B. THE HEALTHCARE INSTITUTION — but the patient has the RIGHT OF ACCESS to their own medical records and can request copies

C. The treating physician

D. The insurance company

✓ **Answer: B**

💡 **Rationale & Explanation:**

Medical record ownership in the Philippines: RA 10173 (Data Privacy Act) and DOH regulations: the PHYSICAL RECORD is the property of the HEALTHCARE INSTITUTION that created it. However, the PATIENT has the right to ACCESS, REQUEST COPIES, and REVIEW their own records. INSTITUTIONS MUST: maintain records for a minimum period (typically 10 years for adults); respond to patient record requests; protect records from unauthorized access. PT IMPLICATIONS: PT documentation forms part of the official medical record — it belongs to the institution; the PT has professional and legal accountability for

the accuracy and completeness of their documentation; patients requesting PT evaluation reports must be accommodated within the legal framework.

ETHICS

169. 'Conflict of interest' in PT practice arises when:

A. A PT treats multiple patients simultaneously

B. A PT has a FINANCIAL, PERSONAL, OR PROFESSIONAL INTEREST that could INAPPROPRIATELY INFLUENCE clinical decisions — e.g., referring patients to their own private clinic (self-referral), prescribing equipment from which they receive commission, treating family members whose relationship may distort clinical judgment

C. A PT disagrees with a physician

D. A PT takes sick leave

✓ Answer: B

💡 Rationale & Explanation:

Conflicts of interest: FINANCIAL: PT refers patients to their own facility (self-referral — PT benefits financially); receives gifts/incentives from equipment vendors. PERSONAL: treating family/friends (relationship may distort clinical judgment). PROFESSIONAL: pressure to discharge patients who are still clinically needy (institutional cost-cutting). MANAGEMENT: DISCLOSURE (inform patients of any potential conflict); RECUSAL (when the conflict cannot be managed, remove yourself from the decision); TRANSPARENCY (keep all referral decisions based on patient best interest). IN RESEARCH: disclose all funding sources and potential conflicts in publications. COI management is a cornerstone of professional integrity and patient trust.

RESEARCH & EBP

170. A 95% CI that CROSSES the 'line of no effect' means:

A. The treatment is definitely effective

B. The RESULT IS NOT STATISTICALLY SIGNIFICANT at p<0.05 — the true effect is uncertain (could be zero or even in the opposite direction); this does NOT mean the treatment doesn't work, just that this study couldn't detect a statistically significant effect

C. The treatment is definitely harmful

D. The CI is too wide to be valid

✓ Answer: B

💡 **Rationale & Explanation:**

CI and statistical significance: 95% CI crossing the null (0 for mean differences, 1.0 for RRs): NOT statistically significant at p<0.05. IMPORTANT NUANCE: CI just crossing the null (e.g., CI: -0.5 to 15.0) = probably positive effect but underpowered to confirm statistically. CI far from null on both sides (CI: -15 to 15) = truly no effect. CLINICAL DECISION: consider the WHOLE CI, not just whether it crosses the null. A CI from -0.5 to 15.0 suggests the treatment is LIKELY effective but the study couldn't prove it statistically (likely underpowered) — clinical judgment and other evidence needed. This nuanced CI interpretation is a key EBP competency.

HEALTHCARE ADMINISTRATION

171. 'Telehealth PT' documentation must include what additional elements vs. in-person PT?

A. Nothing additional

B. PATIENT LOCATION (where the patient was physically during the session), TECHNOLOGY PLATFORM USED (must be encrypted/privacy-compliant), CONFIRMATION OF INFORMED CONSENT for telehealth, NOTE THAT PHYSICAL EXAM WAS CONDUCTED VIA VIDEOCONFERENCE WITH ANY LIMITATIONS NOTED, and EMERGENCY PROTOCOLS EXPLAINED

C. Shorter notes are acceptable

D. Only billing codes

✓ **Answer: B**

💡 **Rationale & Explanation:**

Telehealth PT documentation standards: standard PT documentation PLUS: 1) PATIENT LOCATION: where the patient was physically located during the session (important for licensure jurisdiction); 2) TECHNOLOGY PLATFORM: note the video platform used (must be RA 10173-compliant — encrypted, private); 3) CONSENT: documentation that telehealth consent was obtained; 4) PHYSICAL EXAM LIMITATIONS: note what portions could not be performed remotely and how addressed; 5) EMERGENCY PROTOCOL: document that the patient knows what to do in an emergency during the telehealth session; 6) PATIENT IDENTITY VERIFICATION: confirm identity at the start of each session. PRC/PAPT guidelines for telehealth PT documentation were developed during COVID-19 and continue to be refined.

├─ ETHICS

172. The 'principle of proportionality' in end-of-life PT means:

A. Always provide maximum rehabilitation

B. PT interventions should be proportional to the EXPECTED BENEFIT — in palliative/end-of-life care, treatments causing significant burden without meaningful benefit should be reconsidered; goals shift to COMFORT, QUALITY OF LIFE, and DIGNIFIED FUNCTION

C. Withhold PT from dying patients

D. Prioritize physiological measures over comfort

✓ **Answer: B**

💡 **Rationale & Explanation:**

Proportionality in palliative PT: PT goals and intensity must ALIGN WITH THE PATIENT'S CHOICES and prognosis. CURATIVE phase:

aggressive rehabilitation appropriate even if temporarily uncomfortable. PALLIATIVE phase: prioritize comfort positioning, maintaining meaningful activities, dignity, family support, symptom management. END-OF-LIFE phase: gentle positioning, passive ROM for comfort, assistance with valued activities, caregiver education. ETHICAL PRINCIPLE: the intervention's potential BENEFIT must be proportional to its BURDEN — not 'maximum intervention always.' Forcing intensive rehabilitation on a palliative patient who wants only comfort violates both proportionality and autonomy.

├─ RESEARCH & EBP

173. **The 'ecological fallacy' in research is:**

A. A statistical calculation error

B. Making INCORRECT INFERENCES about INDIVIDUALS based on AGGREGATE (GROUP-LEVEL) DATA — a common error when interpreting population statistics; correlations found at the group level cannot be directly applied to individual-level conclusions

C. Publication bias

D. A type of selection bias

✓ Answer: B

💡 Rationale & Explanation:

Ecological fallacy (Robinson, 1950): when group-level correlations are incorrectly applied to individual-level conclusions. EXAMPLE: countries with higher PT-to-population ratios have lower chronic disability rates → INCORRECT inference: 'individual patients who receive PT have lower disability' — confounders (wealth, overall healthcare quality, diet, culture) may explain the group-level correlation. IN PT RESEARCH: aggregate outcome data from a rehabilitation center (average Barthel improvement) cannot predict an individual patient's outcome without individual-level data. Understanding this fallacy helps PTs critically appraise health policy and population-based research.

PROFESSIONAL PRACTICE

174. A PT student in clinical internship:

A. Has the same scope as a licensed PT

B. Is limited to activities performed UNDER DIRECT SUPERVISION of a licensed RPT — the PT student may perform assessments and treatments as part of clinical education, but the SUPERVISING RPT bears professional responsibility for all care delivered

C. Has a broader scope than a licensed PT

D. Has completely restricted — no patient contact

✓ Answer: B

💡 Rationale & Explanation:

PT student scope in clinical education: CAN PERFORM clinical assessments and treatments under supervision. MUST: be directly supervised by a licensed RPT; have work reviewed and countersigned; not practice independently; not sign clinical documents as the treating therapist; not take professional responsibility for care. SUPERVISING RPT: holds professional and legal responsibility; must be physically present or immediately available; reviews all documentation; co-signs clinical notes. PT students must CLEARLY IDENTIFY THEMSELVES as students to patients. The patient's right to decline treatment by a student must be respected. This supervised scope protects patients while facilitating experiential learning.

RESEARCH & EBP

175. The 'PROSPERO registry' for systematic reviews is used to:

A. Satisfy journal requirements only

B. PREVENT OUTCOME REPORTING BIAS — pre-registering the primary outcomes, inclusion criteria, and analysis plan BEFORE conducting the

review ensures transparency and prevents selective reporting of favorable outcomes after results are known

C. Ensure government funding

D. Save time in writing

✓ Answer: B

💡 **Rationale & Explanation:**

PROSPERO systematic review registration: free registry (University of York) for systematic review protocols. PURPOSE: 1) TRANSPARENCY: researchers declare methods BEFORE seeing results; 2) PREVENTS SELECTIVE REPORTING BIAS: pre-specified outcomes cannot be changed after results are known; 3) DUPLICATION PREVENTION: researchers worldwide can see what reviews are in progress; 4) ACCOUNTABILITY: registered reviews can be compared with published versions to identify deviations. SIGNIFICANCE: journals increasingly require PROSPERO registration for systematic review publication. Philippine PT graduate students conducting systematic reviews for theses should register protocols in PROSPERO early — demonstrates rigor, increasingly required by ethics committees and journals.

├— ETHICS

176. 'Social determinants of health' are relevant to PT ethics because:

A. PT practice is purely biomedical

B. POVERTY, EDUCATION, HOUSING, FOOD SECURITY, TRANSPORTATION, AND EMPLOYMENT affect patients' ability to access PT, adhere to home programs, purchase assistive devices, and achieve rehabilitation goals — IGNORING these factors in PT planning is ethically problematic; the ethical PT recognizes and addresses social determinants

C. Only physicians address social issues

D. Social factors don't affect rehabilitation

✓ Answer: B

💡 **Rationale & Explanation:**

Social determinants and PT ethics: A patient in poverty: cannot afford copayments → drops out; cannot afford home exercise equipment → limited home program; lives in a home with stairs but cannot afford ramp → discharge planning fails. ETHICAL PT RESPONSE: SCREEN for social determinants (ask about barriers to care); ADAPT the treatment plan (free home exercise programs using household items; simplified education; community health worker follow-up); ADVOCATE for accessible PT services; COLLABORATE with medical social workers; REFER to social support services. Ignoring social determinants reduces PT effectiveness and reinforces health inequity.

├─ RESEARCH & EBP

177. 'Sensitivity analysis' in a meta-analysis tests:

A. Sample size adequacy

B. The ROBUSTNESS of the pooled results by systematically EXCLUDING STUDIES based on pre-defined criteria (high-risk-of-bias studies, outlier studies) to see if the overall conclusion changes substantially — robust = results remain similar after exclusion; fragile = results change significantly

C. Statistical power

D. Missing data management

✓ **Answer: B**

💡 **Rationale & Explanation:**

Sensitivity analysis in meta-analysis: RE-RUN the meta-analysis EXCLUDING studies based on: HIGH RISK OF BIAS; OUTLIERS (extreme effect sizes); UNPUBLISHED STUDIES; SPECIFIC STUDY TYPES (pilot studies). INTERPRETATION: results remain similar AND statistically significant after removing high-RoB studies → ROBUST conclusion (not driven by poor quality studies). Effect disappears when high-RoB studies excluded → evidence primarily from poor-quality studies →

state conclusion with LOWER CONFIDENCE. WHY IT MATTERS: if a PT guideline's evidence only remains significant because of high-RoB studies, the recommendation should be weaker. Reading sensitivity analysis sections in meta-analyses is an important EBP skill.

├— PROFESSIONAL PRACTICE

178. 'Telehealth barriers' specific to the Philippine context include:

A. Only physician opposition

B. INFRASTRUCTURE GAPS (internet access in rural/low-income areas), PATIENT DIGITAL LITERACY (elderly patients), REGULATORY GAPS (not fully established by PRC for PT), and PHYSICAL EXAMINATION LIMITATIONS — though rapidly improving with post-COVID-19 acceleration and PhilHealth considering telehealth reimbursement

C. All evidence being negative

D. All patients having smartphones

✓ Answer: B

💡 **Rationale & Explanation:**

Telehealth PT barriers in the Philippines: INFRASTRUCTURE: only 60-70% of Filipinos have smartphone/internet access; rural areas have poor connectivity (slow, unstable internet). DIGITAL LITERACY: elderly patients (highest rehabilitation needs) often struggle with technology; family assistance required for some. REGULATORY GAPS: PT-specific telehealth regulations are still developing; licensure jurisdiction across provinces is unresolved. CLINICAL LIMITATIONS: PT relies heavily on hands-on examination and treatment; telehealth appropriate for: exercise instruction, education, adherence monitoring, functional movement assessment via video — but not for manual therapy or physical modality treatment. ENABLERS: COVID-19 acceleration; PAPT developing telehealth clinical guidelines; PhilHealth considering telehealth reimbursement.

ETHICS

179. 'Evidence-informed practice' vs. strict 'evidence-based practice' acknowledges that:

A. Only RCTs should guide PT decisions

B. CLINICAL EXPERTISE, PATIENT VALUES, AND CONTEXTUAL FACTORS must be integrated with the best available evidence — pure EBP dogmatically applied to every patient is not always appropriate or possible; the Philippine setting (resource constraints, cultural factors, feasibility) requires contextually adapted evidence application

C. Evidence can be completely ignored

D. Clinical experience alone is sufficient

✓ Answer: B

💡 Rationale & Explanation:

Evidence-informed vs. evidence-based practice: STRICT EBP: apply findings of highest-quality evidence to every clinical decision. LIMITATIONS: evidence may not exist for your specific population (elderly Filipino with multiple comorbidities vs. young Western athlete in the RCT); the setting (rural Philippine health center) may not support the evidence-based intervention. EVIDENCE-INFORMED PRACTICE: uses the SAME THREE PILLARS (best evidence + clinical expertise + patient values) but explicitly acknowledges: clinical expertise matters when evidence is absent; patient preferences are CENTRAL; feasibility in the specific context must be assessed. This is the MORE MATURE, REALISTIC approach — not a license to ignore evidence, but an acknowledgment of its limitations and the importance of judgment.

RESEARCH & EBP

180. 'Relative vs. absolute risk reduction': a study reports that treatment reduces pain incidence by 50% (RRR). Without knowing the baseline risk,

this information is:

A. Sufficient for clinical decision-making

B. INSUFFICIENT — a 50% RRR from a very small baseline risk (e.g., 2% to 1%) represents only 1% ARR (NNT = 100), very different from a 50% RRR from a large baseline risk (40% to 20% = 20% ARR, NNT = 5); ABSOLUTE RISK REDUCTION and NNT are essential for clinical relevance

C. Always impressive

D. Only relevant for meta-analysis

✓ Answer: B

💡 **Rationale & Explanation:**

RRR vs. ARR: RELATIVE RISK REDUCTION (RRR): proportional reduction from baseline (50% sounds impressive). WITHOUT KNOWING BASELINE: cannot determine clinical importance. ABSOLUTE RISK REDUCTION (ARR) = control rate - treatment rate. NUMBER NEEDED TO TREAT (NNT) = 1/ARR: most clinically useful — how many patients must receive treatment for one to benefit? EXAMPLE: Drug reduces stroke risk from 2% to 1%: RRR = 50% (impressive!); ARR = 1%; NNT = 100. Same drug reduces stroke risk from 40% to 20%: RRR = 50%; ARR = 20%; NNT = 5. The same RRR represents very different clinical significance depending on baseline risk. Always request BOTH RRR and ARR for complete clinical interpretation.

├— PROFESSIONAL PRACTICE

181. In the Philippines, the PT's referral pathway in most Philippine government hospitals requires:

A. Self-referral only

B. A MEDICAL REFERRAL SLIP from a physician — GP → PT, or specialist → PT; with growing primary-contact PT models, some private outpatient PT clinics accept self-referral; however, the current

standard in most Philippine hospitals requires a medical referral for PT services

C. Emergency room only

D. No referral needed anywhere

✓ **Answer: B**

💡 **Rationale & Explanation:**

Philippine PT referral system: TRADITIONAL MODEL (most government and private hospitals): 1) Patient sees GP or specialist; 2) Doctor issues REFERRAL SLIP with medical diagnosis and PT request; 3) Patient presents referral slip to PT department; 4) PT performs evaluation and initiates treatment. CURRENT TRENDS: some private outpatient PT clinics operate on direct/self-referral; occupational health settings; sports medicine. WORLD PHYSIOTHERAPY POSITION: advocates for DIRECT ACCESS TO PT globally — evidence shows direct PT access produces equivalent outcomes to GP-first pathways at lower cost for musculoskeletal conditions. Philippine PT ADVOCACY: PAPT advocates for legislative recognition of direct PT access, aligned with global trends.

├─ ETHICS

182. The 'principle of double effect' applied to painful PT interventions: the intervention is ethically justifiable IF:

A. Pain is always unjustifiable

B. ALL FOUR CONDITIONS ARE MET: 1) The action itself is not intrinsically wrong; 2) The PT's intention is the good outcome (improved function), not the pain; 3) The pain is a foreseen but UNINTENDED side effect, not the means to the good; 4) The good (improved function) proportionately outweighs the harm (temporary pain); AND the patient has given INFORMED CONSENT

C. Pain is always necessary

D. No ethical analysis is needed

✓ **Answer: B**

💡 **Rationale & Explanation:**

Double effect in PT: applying the 4 conditions to aggressive stretching: 1) INTRINSICALLY PERMISSIBLE: therapeutic stretching is an accepted PT intervention; 2) GOOD INTENTION: the PT aims to restore function — pain is an unfortunate side effect, not the goal; 3) PAIN AS SIDE EFFECT, NOT MEANS: improved ROM is achieved by tissue elongation — the pain itself does not produce the benefit; 4) PROPORTIONALITY: the functional gain (walking, independent ADLs) must outweigh the short-term pain burden. INFORMED CONSENT: critical — the patient must understand the procedure will be painful, the expected benefit, and the alternatives. A patient who understands and agrees demonstrates that the proportionality judgment is reasonable.

├— RESEARCH & EBP

183. The 'Delphi method' in PT research is appropriate for:

A. When an RCT is needed

B. REACHING EXPERT CONSENSUS on topics where direct experimentation is difficult — using iterative rounds of anonymous questionnaires among experts to reach consensus on clinical guidelines, best practices, or taxonomies

C. A case study

D. A meta-analysis

✓ **Answer: B**

💡 **Rationale & Explanation:**

Delphi method: PROCESS: 1) Expert panel identified; 2) ROUND 1: anonymous open-ended questions; 3) Responses collated, summarized, returned to panel; 4) ROUND 2+: experts rate agreement with statements (1-9 Likert scale), revise opinions if persuaded; 5) Consensus reached when >75-80% of experts agree. USES IN PT: developing CPGs when RCT evidence is absent; defining PT

subspecialty scope; creating standardized terminology; establishing outcome measure batteries. ADVANTAGES: anonymity reduces social pressure; iterative rounds improve consensus; geographically dispersed experts can participate. LIMITATIONS: consensus ≠ truth; subject to framing bias; Delphi-derived guidelines should be updated as evidence accumulates.

├— PROFESSIONAL PRACTICE

184. 'MCI triage ethics' during disasters: the PT applies:

A. Normal individual beneficence to each patient

B. UTILITARIAN ETHICS — greatest good for the greatest number with limited resources; this may mean withholding care from the most severely injured when survival is not possible, to focus on those who can benefit most (START triage: Immediate, Delayed, Minor, Expectant)

C. Always prioritize the most severely injured

D. Only treat sports injuries during disasters

✓ Answer: B

💡 **Rationale & Explanation:**

MCI triage ethics for PTs: normal healthcare ethics (individual beneficence) is replaced by POPULATION-LEVEL UTILITARIAN ETHICS during disasters. START TRIAGE: Immediate (Red) = life-threatening but SURVIVABLE; Delayed (Yellow) = serious but can wait; Minor (Green) = walking wounded; Expectant (Black) = fatal injuries (do NOT use significant resources). PT SKILLS IN DISASTERS: triage assessment; field stabilization; airway positioning; basic wound care; patient movement assistance; survivor rehabilitation. ETHICAL TENSION: walking past a critically injured person to treat a more salvageable patient violates normal beneficence but serves utilitarian disaster ethics. Post-disaster ethical debriefing is ESSENTIAL for healthcare providers who made such decisions.

├— RESEARCH & EBP

185. The 'case series' in PT research:

A. Is always sufficient for practice recommendations

B. Describes outcomes for a small group of patients (typically 3-20) with similar conditions treated with the same intervention — without a control group; provides HYPOTHESIS-GENERATING but not CAUSATIVE evidence (Level IV)

C. Requires randomization

D. Is only published in low-quality journals

✓ Answer: B

💡 **Rationale & Explanation:**

Case series: collects and reports outcomes for a series of patients without RANDOMIZATION or CONTROL GROUP. EVIDENCE LEVEL: LOW (Level 4). VALUE: 1) Generates HYPOTHESES for future RCTs; 2) Describes outcomes for RARE CONDITIONS where RCTs are impractical; 3) Documents ADVERSE EVENTS or unexpected outcomes; 4) Describes patterns of clinical presentation. LIMITATIONS: no comparison group; selection bias; no blinding; results may not generalize. VALID USE: appropriate for rare conditions, novel interventions in early stages, adverse event reporting — but must be interpreted cautiously as correlation is not causation. In Philippine PT research: case series are common for newer interventions and rare conditions where RCTs are not feasible.

├— PROFESSIONAL PRACTICE

186. The 'Philippine Board of Examiners for Physical Therapists' examination passing standard requires:

A. Any average above 50%

B. A GENERAL WEIGHTED AVERAGE of at least 75% with NO INDIVIDUAL SUBJECT SCORE BELOW 60% to pass the licensure examination

C. 75% on any single subject

D. 80% general average

✓ **Answer: B**

💡 **Rationale & Explanation:**

PRC PT licensure examination passing standard: PASSING CRITERIA: 1) General WEIGHTED AVERAGE of at least 75%; 2) No individual subject score below 60%. CONDITIONAL PASS: achieves ≥75% average but scores <60% in one or more subjects → must retake those specific subjects. If the candidate fails the retake → FAILURE. 3 or more failures may require additional requirements imposed by the PBPT. ALL SUBJECTS at ≥60% but average <75%: FAILURE. The examination covers: basic sciences (anatomy, physiology, kinesiology, pathology), clinical sciences (musculoskeletal, neurological, cardiopulmonary PT), PT procedures and modalities, and professional practice/ethics — the same 5 areas covered in this reviewer.

├─ ETHICS

187. The 'best interest standard' for incapacitated patients requires the decision-maker to:

A. Always follow family preferences

B. Choose the option that PROMOTES THE PATIENT'S WELLBEING, taking into account their known values and preferences (if known), and objective medical benefit — not what is best for the family or institution

C. Always choose the most expensive treatment

D. Always choose the least invasive treatment

✓ **Answer: B**

💡 **Rationale & Explanation:**

Best interest standard: when a patient LACKS decision-making capacity AND has no advance directive, the surrogate decision-maker must apply: 1) What would PROMOTE THE PATIENT'S WELLBEING? 2) What DID the patient VALUE? (even without a formal advance directive, family may know preferences); 3) What does EVIDENCE say about outcomes of available options? 4) Balance QUALITY OF LIFE with QUANTITY OF LIFE. IN PT: when severe TBI, stroke, or advanced dementia prevents consent — PT must be an advocate for the patient's best interests; propose treatments proportional to realistic prognosis; be a voice in the team for appropriate goals. Document all discussions and reasoning carefully.

├─ RESEARCH & EBP

188. 'ITT analysis' (intention to treat) is preferred over 'per-protocol' analysis because:

A. It is easier to calculate

B. ITT PRESERVES RANDOMIZATION and provides a REAL-WORLD EFFECTIVENESS ESTIMATE including non-compliance, dropout, and protocol deviations — per-protocol excludes dropouts and overestimates treatment efficacy in ideal patients

C. It requires smaller samples

D. It has better statistical power always

✓ Answer: B

💡 **Rationale & Explanation:**

ITT vs. per-protocol: PER-PROTOCOL: only includes patients who completed the trial exactly as planned. PROBLEM: dropouts are typically SICKER or LESS MOTIVATED → removing them produces a healthier, more compliant sample → OVERESTIMATES treatment benefit. ITT: all randomized patients analyzed in their ASSIGNED groups regardless of what happened. ADVANTAGES: preserves randomization balance; includes real-world dropout and non-compliance; CONSERVATIVE estimate; represents what you'd expect in

clinical practice. MISSING DATA: handled by last observation carried forward (LOCF), multiple imputation, or mixed models. CONSORT requires ITT analysis for RCTs. When reading PT studies: check if ITT was used — per-protocol results should be interpreted with caution.

├— PROFESSIONAL PRACTICE

189. The 'duty to refer' in PT practice is a PROFESSIONAL OBLIGATION when:

A. Referring is always optional

B. When the patient's condition is BEYOND THE PT'S COMPETENCE, requires MEDICAL DIAGNOSIS, shows RED FLAGS for serious pathology, or requires SPECIALIST INTERVENTION — failure to refer when indicated is a form of negligence

C. Only for surgical conditions

D. Never — PTs should treat all conditions

✓ Answer: B

💡 **Rationale & Explanation:**

PT duty to refer: SITUATIONS REQUIRING REFERRAL: RED FLAGS (unexplained weight loss, constant night pain, fever with MSK pain, bladder/bowel dysfunction, new severe headache, chest pain/dyspnea during PT); BEYOND PT SCOPE (diagnosis requiring imaging, medication, or surgery); INADEQUATE RESPONSE TO PT (no improvement after 6-8 sessions of evidence-based treatment — reconsider the diagnosis and refer); SPECIALIST PT (pelvic floor, vestibular, oncological — when subspecialty expertise is needed). DOCUMENTATION: document reason for referral, who referred to, patient's response. FOLLOW UP: communicate with the receiving provider. Failure to refer when indicated = negligence risk.

├— ETHICS

190. 'Whistleblower protection' in Philippine healthcare:

A. Does not exist

B. PROVIDES SOME PROTECTION for good faith reporting of professional misconduct — although Philippine-specific healthcare whistleblower provisions are still developing; PTs reporting fraudulent billing, patient abuse, unlicensed practice, or dangerous clinical practices in good faith should document everything carefully and use established internal and external reporting channels

C. Always leads to disciplinary action

D. Only physicians can report misconduct

✓ Answer: B

💡 Rationale & Explanation:

Whistleblower protection in Philippine healthcare: LEGAL PROTECTION: Anti-Graft and Corrupt Practices Act; RA 6713 (Code of Conduct for Public Officials — relevant to government hospital staff); developing sector-specific provisions. PT OBLIGATIONS: PAPT Code of Ethics and RA 10210 create the obligation to report unsafe practices and misconduct. CHALLENGES IN THE PHILIPPINES: cultural factors (hiya, authority deference) may discourage reporting; institutional protections for reporters may be inadequate in private settings. BEST APPROACH: use established internal reporting channels first; involve PAPT if institutional channels fail; document ALL communications; seek legal advice for serious allegations. Patient safety comes first despite professional and personal risks.

├— RESEARCH & EBP

191. A 'forest plot' in meta-analysis displays:

A. Patient demographics

B. The EFFECT SIZE ESTIMATE and CONFIDENCE INTERVAL for each study AND the OVERALL POOLED EFFECT — allowing visual assessment

of consistency (heterogeneity) across studies; each study is a SQUARE (size ∝ weight) with horizontal lines (CI); the DIAMOND at the bottom is the pooled effect (width = CI)

C. Statistical significance only

D. Methodological quality scores

✓ Answer: B

💡 **Rationale & Explanation:**

Forest plot: the key graphical output of meta-analysis. FOR EACH STUDY: SQUARE (size proportional to the study's weight) = point estimate; horizontal lines = 95% CI. DIAMOND at the bottom = POOLED EFFECT (width = CI). VERTICAL LINE at 'no effect' (0 for mean differences, 1.0 for risk ratios). INTERPRETING: if a study's CI crosses the null = not statistically significant for that study; if the pooled diamond CI crosses the null = overall intervention not statistically significant. HETEROGENEITY: if squares are scattered widely on both sides of null = high heterogeneity (studies inconsistent). I^2 quantifies heterogeneity: <25% = low, 25-75% = moderate, >75% = high heterogeneity (questions whether pooling was appropriate).

├─ HEALTHCARE ADMINISTRATION

192. 'ISO 9001' quality management for PT clinics primarily provides:

A. Treatment protocols

B. A FRAMEWORK for consistent quality service delivery through: documented processes, staff competency assurance, continuous improvement, customer (patient) satisfaction measurement, and management commitment — demonstrating commitment to standardized, high-quality care to patients, referrers, and insurers

C. Only accreditation for billing

D. Government mandated audit requirements

✓ Answer: B

💡 **Rationale & Explanation:**

ISO 9001 QMS for PT clinics: REQUIREMENTS: 1) PROCESS DOCUMENTATION: all clinical and administrative processes defined and documented (patient flow, assessment protocols, complaint procedures); 2) COMPETENCY MANAGEMENT: staff qualifications, training records, CPE compliance; 3) CUSTOMER FOCUS: patient satisfaction surveys, complaint management; 4) CONTINUOUS IMPROVEMENT: regular review of outcomes and processes; 5) MANAGEMENT REVIEW: leadership reviews quality data. Philippine context: Joint Commission International (JCI) for hospitals; PhilHealth accreditation for insurance reimbursement; ISO 9001 for quality management. ISO certification signals to patients and referrers that the PT service meets international quality standards. While not mandatory, increasingly competitive in private healthcare.

ETHICS

193. The 'PAPT history': PAPT was founded in:

A. 1990

B. 1961 — making it one of the oldest PT professional organizations in Southeast Asia

C. 2000

D. 1945

✓ Answer: B

💡 **Rationale & Explanation:**

PAPT history: The PHILIPPINE ASSOCIATION OF PHYSICAL THERAPISTS (PAPT) was established in 1961. CURRENT STRUCTURE: PAPT National (headquarters); Regional chapters throughout the Philippines; Special Interest Groups (Musculoskeletal, Neurological, Cardiopulmonary, Sports, Pediatric, Women's Health, Geriatric PT). INTERNATIONAL MEMBERSHIP: WORLD PHYSIOTHERAPY (formerly WCPT) — PAPT is the Philippine member organization (representing the Philippines in all international PT matters). ACTIVITIES: annual national conventions (major CPE source); CPD programs; advocacy; PT education standards;

scope of practice guidelines; professional development for Filipino PTs. PAPT membership is voluntary but strongly encouraged for all Filipino PTs.

├─ RESEARCH & EBP

194. 'Case study research' (qualitative research methodology) differs from a 'clinical case report' in that:

A. Both are identical

B. CASE STUDY RESEARCH is a systematic, in-depth investigation of a phenomenon within its real-world context using MULTIPLE DATA SOURCES and EXPLICIT METHODOLOGY — the purpose is theoretical understanding; a CASE REPORT is a clinical description of an interesting patient presentation, primarily for clinical education

C. Both require randomization

D. Only case reports are published

✓ Answer: B

💡 **Rationale & Explanation:**

Case study research vs. case report: CASE REPORT: describes unusual diagnosis, rare presentation, unexpected treatment response; purpose = CLINICAL EDUCATION; evidence level = low (Level V); typically 500-2000 words; no explicit research methodology required. CASE STUDY RESEARCH: multiple data sources (interviews, observations, documents, clinical measures); explicit methodology (data collection protocol, analysis method, member checking); purpose = UNDERSTANDING a complex phenomenon in context; higher evidence level than case reports for qualitative questions. In Philippine PT education: graduate PT students conducting case study research must follow qualitative research standards, not just describe a single clinical case. Understanding this distinction helps PT students design and write appropriate qualitative research.

PROFESSIONAL PRACTICE

195. 'Continuing medical education' (CME) vs. 'continuing professional education' (CPE) in the Philippines:

A. They are identical

B. CME refers specifically to PHYSICIAN continuing education; CPE is the broader term for ALL PRC-REGULATED PROFESSIONS including PT — the mandatory CPE requirement for PT renewal is 45 UNITS per 3-year cycle

C. Only physicians need continuing education

D. PT does not require CPE

✓ Answer: B

💡 Rationale & Explanation:

CPE vs. CME: CME specifically refers to medical doctor continuing education. PT USES THE TERM CPD (Continuing Professional Development) or CPE. PAPT-recognized CPE activities: formal education events (PAPT conventions, specialty workshops, skills training); webinars; online courses; research and publications. DOCUMENTATION: keep all certificates; organize by CPE category; maintain a CPE portfolio throughout the 3-year period. RENEWAL: submit CPE records to PRC with license renewal application. Failure to meet the 45-unit requirement = license renewal denied until requirements are met. CPE is both a legal requirement AND a professional responsibility for maintaining competence.

ETHICS

196. The 'best interest of the patient' vs. 'autonomy' in PT: which takes precedence?

A. Best interest always overrides autonomy

B. Neither — BOTH must be respected: for CAPACITATED patients, AUTONOMY generally takes precedence (a capacitated patient's informed decision to decline treatment must be respected even if the PT believes the treatment is in their best interest); for INCAPACITATED patients, BEST INTEREST standard applies

C. Autonomy always overrides best interest

D. The physician decides the balance

✓ Answer: B

💡 **Rationale & Explanation:**

Balancing autonomy and best interest: CAPACITATED PATIENT who declines treatment: the PT's ethical obligation is to: provide complete information (risks, benefits, alternatives); explore reasons for refusal; offer alternatives; document the discussion; RESPECT THE AUTONOMOUS DECISION. A PT who overrides a capacitated patient's refusal commits both an ethical violation and potentially battery (unlawful touching). INCAPACITATED PATIENT: autonomy cannot be exercised (patient cannot make the decision) → BEST INTEREST STANDARD guides surrogate decision-making. EXCEPTION: PUBLIC HEALTH (a patient's autonomous choice that harms others may be limited) — but this is rare in PT practice. The ethical PT navigates this tension through respectful dialogue, thorough documentation, and interprofessional collaboration.

├— RESEARCH & EBP

197. The 'MCID' for the Oswestry Disability Index (ODI) applied clinically: a patient improving from ODI score 52 to ODI score 38 represents:

A. No meaningful improvement

B. A CLINICALLY MEANINGFUL IMPROVEMENT of 14 points — exceeding the ODI MCID of approximately 10 points; this change is above the threshold that represents a genuinely important improvement in function from the patient's perspective, beyond measurement error

C. Only statistical significance

D. A floor effect

✓ **Answer: B**

💡 **Rationale & Explanation:**

ODI MCID application: ODI MCID = approximately 10 points. Patient improvement: 52 → 38 = 14 point change. 14 > 10 (MCID) → the change IS CLINICALLY MEANINGFUL. This means the PT can conclude with reasonable confidence that the treatment produced a true, important benefit to this patient's functioning — not just measurement noise or natural variation. ADDITIONAL CONTEXT: also check if the change exceeds the MDC (Minimal Detectable Change ≈ 8-10 points for ODI) — yes, 14 points > MDC, so the change is also REAL (above measurement error). When BOTH MDC and MCID are exceeded: real change AND clinically meaningful. This framework helps PTs document treatment effectiveness with clinical rigor.

├─ PROFESSIONAL PRACTICE

198. The Philippine 'Community-Based Rehabilitation' (CBR) matrix includes which domains?

A. Only health

B. HEALTH, EDUCATION, LIVELIHOOD, SOCIAL, AND EMPOWERMENT — CBR addresses the full spectrum of disability-related needs in the community, going far beyond medical rehabilitation to include inclusive education, economic participation, social integration, and self-advocacy

C. Health and education only

D. Medical rehabilitation only

✓ **Answer: B**

💡 **Rationale & Explanation:**

WHO CBR Matrix (2010): 5 DOMAINS: HEALTH (prevention, medical care, rehabilitation, assistive devices); EDUCATION (early childhood,

primary/secondary schools, higher education, lifelong learning); LIVELIHOOD (skills development, self-employment, supported employment, financial services); SOCIAL (personal assistance, relationships and marriage, culture and arts, recreation and sport, justice); EMPOWERMENT (advocacy, communication, community mobilization, political participation, self-help groups). PT ROLE IN CBR: primarily in the HEALTH domain but PT contributes to all 5 domains through: facilitating access to inclusive education (mobility aids, school accessibility), vocational rehabilitation (work adaptation), community participation (transport, accessibility), and self-advocacy training.

├─ ETHICS

199. 'Proportionality in healthcare resource allocation': the PT working in a resource-limited Philippine government hospital should:

A. Always provide the most expensive treatment

B. PRIORITIZE INTERVENTIONS WITH THE BEST EVIDENCE-TO-COST RATIO — exercise therapy + education (low cost, high evidence) over passive modalities (high cost, lower evidence); this is an ethical obligation to be a wise steward of limited public health resources while maximizing patient benefit

C. Refuse to treat patients without full resources

D. Provide no PT services if resources are limited

✓ Answer: B

💡 **Rationale & Explanation:**

Resource stewardship in PT: in resource-limited settings (many Philippine government hospitals), the PT has an ETHICAL OBLIGATION to make wise use of limited resources: HIGHEST VALUE INTERVENTIONS FIRST: exercise therapy + patient education = high evidence, low cost (bodyweight exercises, resistance bands, patient handouts) → PRIORITIZE. PASSIVE MODALITIES: expensive equipment (US machines, diathermy), high supply cost → USE SELECTIVELY based on evidence, not routine; GENERIC MEDICATIONS (where applicable):

advise patients on cost-effective options; REFERRAL EFFICIENCY: refer only when truly necessary, not for routine cases that PT can manage. Being a good steward of public health resources is both ethical (fair distribution of scarce resources) and practical (sustainable healthcare system).

├─ PROFESSIONAL PRACTICE

200. The 'Philippine HRH Master Plan' includes PT in health workforce planning because:

A. PT is not part of health planning

B. PTs are CRITICAL MEMBERS of the health workforce addressing the growing burden of non-communicable diseases, disability, and aging — the HRH Master Plan addresses training, deployment, and retention; current PT shortage (1:20,000-30,000 ratio) and maldistribution require strategic planning to ensure equitable access

C. Only nurses are in HRH planning

D. PT is over-supplied in all regions

✓ Answer: B

💡 **Rationale & Explanation:**

HRH Master Plan and PT: the DOH HRH Master Plan includes PT among essential health workforce cadres. PT SITUATION: critical shortage (1:20,000-30,000 vs. recommended 1:5,000-10,000 in many PT-specific guidelines); GEOGRAPHIC MALDISTRIBUTION (urban concentration); public health sector PT positions inadequate. STRATEGIES IN HRH PLAN: incentivized rural deployment; integration into primary care; PT as public health practitioners (health promotion, prevention programs); community-based rehabilitation expansion; PAPT partnership for deployment programs. SIGNIFICANCE: recognizing PTs as essential health workforce (not just hospital specialists) is the basis for advocacy for more PT positions in public health and primary care in the Philippines.

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201. Under RA 10210, the PT's 'scope of practice' includes all EXCEPT:

A. Performing physical and neurological assessments

B. Prescribing medications or performing surgery — these are beyond the PT's defined scope regardless of training; PT scope includes assessment, diagnosis (movement dysfunction), and physical therapy interventions

C. Administering physical therapy modalities

D. Developing and implementing rehabilitation programs

✓ Answer: B

💡 **Rationale & Explanation:**

PT scope of practice under RA 10210: INCLUDED: assessment and evaluation; PT diagnosis (movement dysfunction, functional limitations); planning and implementation of PT programs; use of physical agents (heat, cold, ultrasound, electrical stimulation, light); therapeutic exercise; manual therapy; functional training; patient/family education; consultation and referral. EXCLUDED: prescribing medications (physician scope); performing surgery (physician scope); interpreting laboratory results for diagnosis (physician); ordering imaging (physician — PT can request). GROWING SCOPE: dry needling (evolving); ergonomic assessment; health promotion; telehealth — these are areas of expanding PT scope with appropriate training.

ETHICS

202. The 'PAPT Code of Ethics' — which principle specifically addresses avoiding EXPLOITATION of the therapeutic relationship?

A. Beneficence

B. RESPECT FOR THE THERAPEUTIC RELATIONSHIP — the PT must maintain appropriate professional boundaries; not exploit the trust, vulnerability, or dependency inherent in the patient-provider relationship for personal, financial, or sexual gain; any exploitation

violates the fundamental fiduciary nature of the PT-patient relationship

C. Justice

D. Nonmaleficence

✓ Answer: B

💡 **Rationale & Explanation:**

Exploitation of therapeutic relationship: the PT-patient relationship is FIDUCIARY (the patient places trust in the PT who has power/knowledge advantage). EXPLOITATION: using this trust for: FINANCIAL gain (charging for unnecessary services, overcharging vulnerable patients); SEXUAL exploitation (sexual contact with patients is always unethical — the power differential makes true consent impossible); PERSONAL BENEFIT (obtaining gifts, loans, unpaid work from patients); EMOTIONAL exploitation (maintaining patient dependency beyond clinical need). PATIENT VULNERABILITY: patients are often in pain, frightened, and dependent — this creates HEIGHTENED ETHICAL OBLIGATION to maintain proper boundaries. The PT Code of Ethics in all jurisdictions explicitly addresses this — it is a PRIMARY ethical concern in PT practice.

├— RESEARCH & EBP

203. 'Publication bias' in research means:

A. All studies are published

B. STUDIES WITH POSITIVE RESULTS are more likely to be published than studies with NEGATIVE or NULL RESULTS — this skews the published literature toward positive findings, potentially making interventions appear more effective than they truly are when synthesized in meta-analyses

C. Authors are biased

D. Journals only publish about diseases

✓ Answer: B

💡 **Rationale & Explanation:**

Publication bias: studies showing SIGNIFICANT POSITIVE EFFECTS: more likely to be submitted for publication; more likely to be accepted by journals; published faster. STUDIES with NULL or NEGATIVE RESULTS: less likely to be submitted (researchers believe they will be rejected); less likely to be accepted (journals prefer 'exciting' findings); sometimes never published. CONSEQUENCE FOR SYSTEMATIC REVIEWS: pooled effects may be INFLATED if they are based only on published, positive studies. DETECTION: funnel plot asymmetry (in meta-analyses) — if the funnel is asymmetric, publication bias may be present. REMEDIES: prospective trial registration (clinicaltrials.gov, PROSPERO); CONSORT reporting standards; negative results journals. PHILIPPINE PT CONTEXT: publishing negative PT research results builds the evidence base more accurately than only publishing successful trials.

├— PROFESSIONAL PRACTICE

204. The PRC examination for PT is administered how often?

A. Once every 5 years

B. AT LEAST ONCE A YEAR — the PRC Act requires that licensure examinations for all regulated professions be administered at least annually; the PT board examination is typically held twice a year (in some years) with specific examination periods announced by the PRC

C. Only every 2 years

D. Whenever there are enough candidates

✓ Answer: B

💡 **Rationale & Explanation:**

PRC PT licensure examination schedule: RA 8981 (PRC Act) requires: licensure examinations administered AT LEAST ONCE PER YEAR. In practice for PT: typically administered TWICE PER YEAR — once in the first semester (typically April-May) and once in the second semester

(typically October-November). REGISTRATION REQUIREMENTS: must be a graduate of an accredited BSPT program; must submit the required documents (TOR, NSO birth certificate, physician's certificate, etc.) during the announced registration period. PASSING STANDARD: ≥75% general weighted average with no subject below 60%. Results are typically released 5-7 working days after the last examination day.

ETHICS

205. 'Informed consent' is valid ONLY when the patient:

A. Signs the consent form

B. HAS DECISION-MAKING CAPACITY, receives ADEQUATE INFORMATION (diagnosis, proposed treatment, alternatives, risks, benefits, right to refuse), UNDERSTANDS the information (comprehension confirmed), and makes a VOLUNTARY decision FREE FROM COERCION — a signature alone is insufficient without these elements

C. Is above 18 years of age

D. Has no mental health history

✓ Answer: B

💡 Rationale & Explanation:

Valid informed consent criteria: 1) CAPACITY: the patient has decision-making capacity for this specific decision (see sliding scale of capacity); 2) DISCLOSURE: adequate information provided — diagnosis, proposed treatment, ALTERNATIVES (including doing nothing), risks, expected benefits, prognosis with and without treatment, right to refuse; 3) COMPREHENSION: the patient UNDERSTANDS the information — confirmed by asking them to explain it back (teach-back method); provide in their language; use plain language; 4) VOLUNTARINESS: free from coercion, undue influence, or manipulation — allowing adequate time to decide, respecting hesitation, not pressuring. A SIGNATURE ALONE is not sufficient — if the patient didn't understand or wasn't

given complete information, the consent is invalid despite the signature.

HEALTHCARE ADMINISTRATION

206. The 'Donabedian triad' in PT quality improvement: STRUCTURE includes:

A. Patient outcomes

B. The physical and organizational RESOURCES of the healthcare setting — number of PT staff, their qualifications and training, equipment available, facility accessibility, documentation systems, policies and procedures, funding

C. Treatment session content

D. Patient satisfaction

✓ Answer: B

💡 **Rationale & Explanation:**

Donabedian triad — STRUCTURE: PHYSICAL RESOURCES: treatment rooms, equipment (US machines, exercise equipment, traction equipment, assessment tools), assistive devices, computer systems. HUMAN RESOURCES: number of PTs, PT:patient ratio, staff qualifications, CPD compliance, experience levels. ORGANIZATIONAL: policies and procedures, quality standards, leadership and management systems, information systems. FINANCIAL: funding, budgets, insurance coverage. Structure ENABLES quality care but does NOT guarantee it — a well-equipped department with inadequate processes still produces poor outcomes. The connection: GOOD STRUCTURE → enables GOOD PROCESSES → which produce GOOD OUTCOMES. All three must be adequate.

RESEARCH & EBP

207. The 'P-value' in research statistics means:

A. The probability the treatment works

B. The probability of obtaining results AS EXTREME OR MORE EXTREME than those observed if the NULL HYPOTHESIS (no treatment effect) is TRUE — p<0.05 means there is a <5% chance of this extreme result occurring by chance alone (assuming no true effect)

C. The magnitude of the treatment effect

D. The clinical importance of the finding

✓ Answer: B

💡 **Rationale & Explanation:**

P-value interpretation: p = the probability of observing the data (or more extreme data) if the null hypothesis (H0: no effect) is TRUE. p<0.05: less than 5% chance of getting this result by chance if truly no effect → STATISTICALLY SIGNIFICANT (we reject H0). p>0.05: more than 5% chance → NOT STATISTICALLY SIGNIFICANT (we fail to reject H0). IMPORTANT: p-value does NOT tell you: the magnitude of the effect (that's the effect size); whether the effect is clinically meaningful (that's the MCID); the probability that the treatment truly works (that's Bayesian probability). A very large study can show a statistically significant (p<0.001) but clinically trivial effect (e.g., 0.5mm VAS improvement). ALWAYS pair p-value with EFFECT SIZE AND CLINICAL SIGNIFICANCE assessment.

├— PROFESSIONAL PRACTICE

208. 'Physical therapy aide' vs. 'physical therapy assistant' vs. 'physical therapist': in the Philippine context:

A. All are the same profession

B. The RPT (Registered Physical Therapist) is the only licensed PT professional in the Philippines under RA 10210; 'PT aide' roles exist in some settings as unlicensed support staff; there is NO official 'PT

assistant' licensure category in the Philippines (unlike the USA which has licensed PTAs)

C. PT assistants have the same scope as RPTs

D. PT aides can perform all PT procedures

✓ Answer: B

💡 **Rationale & Explanation:**

Philippine PT staffing: REGISTERED PHYSICAL THERAPIST (RPT): licensed by PRC under RA 10210; full PT scope of practice; bears professional and legal responsibility. PT AIDE (unlicensed): performs non-clinical support tasks (setting up equipment, cleaning, escorting patients) under RPT supervision; CANNOT perform clinical procedures or PT assessments; NOT licensed by PRC. PHYSICAL THERAPY ASSISTANT (PTA): a separate licensed credential in the USA and some countries; does NOT exist as a separate licensed category in the Philippines. IMPORTANT for PT boards: in the Philippines, there is NO licensed PTA category — only licensed RPTs and unlicensed support staff. This differs from the USA model. The RPT must be aware of the legal and professional implications of task delegation.

├─ ETHICS

209. 'Cultural competence' in PT for Filipino patients requires:

A. Ignoring cultural factors

B. Understanding HOW FILIPINO CULTURAL VALUES (kapwa — shared identity, utang na loob — debt of gratitude, hiya — shame, pakikisama — getting along, pagiging marespeto — respectfulness) affect the THERAPEUTIC RELATIONSHIP and PT outcomes — and adapting communication and practice accordingly

C. Only speaking Filipino

D. Only treating Filipino patients

✓ Answer: B

💡 **Rationale & Explanation:**

Filipino cultural competence in PT: KAPWA: Filipinos tend to see themselves in relation to others — use family involvement in goal-setting and rehabilitation; include family members in education sessions. HIYA (shame): Filipino patients may not express pain or concerns directly out of shame/embarrassment — create a SAFE, ACCEPTING environment; ask in a non-judgmental way. UTANG NA LOOB: gratitude debt — patients may feel obligated to comply (even if in pain) to 'repay' the therapist's care; reassure that expressing pain or concerns is appropriate and expected. PAGIGING MARESPETO: respectful, polite communication is expected; address patients formally (Mister, Miss, Ate, Kuya) unless invited to use first names. CULTURAL HUMILITY: recognize your own cultural biases; ask and listen; adapt your approach for each individual patient.

├─ RESEARCH & EBP

210. A 'meta-analysis' provides HIGHER statistical power than individual trials because:

A. It uses different statistics

B. It COMBINES DATA from multiple studies, EFFECTIVELY INCREASING THE SAMPLE SIZE — allowing detection of smaller but real treatment effects that individual studies were too small to detect; also provides a more stable and generalizable estimate of the true treatment effect

C. It excludes negative studies

D. All authors agree on the result

✓ Answer: B

💡 **Rationale & Explanation:**

Meta-analysis statistical power: by combining multiple studies, meta-analysis creates a VIRTUAL LARGE STUDY. POWER = ability to detect a true treatment effect. Individual RCTs are often underpowered (too small to reliably detect moderate effects). META-ANALYSIS: pools data → effective N is the sum of all study participants → MUCH GREATER STATISTICAL POWER → can detect even SMALL treatment effects

(which individual studies missed). EXAMPLE: 10 studies each n=50 (total n=500) might individually all be underpowered → no single study shows significance → META-ANALYSIS pools all 500 patients → sufficient power to detect a moderate effect. THIS EXPLAINS why meta-analyses sometimes show significant effects when all individual trials showed non-significant results — none was large enough alone.

├— PROFESSIONAL PRACTICE

211. The 'referral process' in the Philippine healthcare system: when a PT receives a referral for 'physical therapy — please evaluate and treat,' the PT:

A. Must follow exactly what the physician wrote

B. HAS PROFESSIONAL AUTONOMY to perform a comprehensive PT evaluation, formulate a PT diagnosis and problem list, set SMART goals with the patient, and design an INDIVIDUALIZED TREATMENT PLAN — the referring physician provides the medical diagnosis; the PT provides the clinical judgment about PT-specific management

C. Can only treat the body part mentioned

D. Must wait for more specific instructions

✓ Answer: B

💡 Rationale & Explanation:

PT professional autonomy with referral: a referral for 'PT evaluate and treat' gives the PT BROAD CLINICAL AUTHORITY to: 1) Conduct a comprehensive assessment; 2) Formulate the PT diagnosis (movement dysfunction, functional limitations); 3) Set patient-centered SMART goals; 4) Design evidence-based interventions; 5) Reassess and modify the plan based on response. The PT COMMUNICATES with the referring physician when: RED FLAGS are identified; the patient is not progressing as expected; a condition outside PT scope is found; significant findings change the clinical picture. The PT does NOT need physician approval for each PT session or technique — the PT has independent professional judgment within their scope of practice.

ETHICS

212. 'Advance directives' are relevant to PT because:

A. PT never cares for terminally ill patients

B. The PT must RESPECT AND HONOR a patient's previously stated wishes about their healthcare — if a patient has a 'Do Not Resuscitate' (DNR) order, a living will, or an advance directive limiting certain interventions, the PT must incorporate these into rehabilitation goals and avoid treatments that conflict with the patient's expressed wishes

C. PTs override advance directives for rehabilitation

D. Advance directives only apply to surgeons

✓ Answer: B

💡 **Rationale & Explanation:**

Advance directives and PT: LIVING WILL: a document specifying what treatments the patient wants or does NOT want if incapacitated. DNR ORDER: instructs healthcare providers not to attempt CPR if the patient's heart stops. HEALTHCARE PROXY: designates a person to make decisions when the patient cannot. PT OBLIGATIONS: 1) KNOW what advance directives exist for your patient (check the chart); 2) HONOR them — if a patient has requested no aggressive resuscitation, the PT should not initiate CPR in cardiac arrest; 3) TAILOR REHABILITATION GOALS to align with the patient's expressed values (a patient with a comfort-only advance directive may not want aggressive rehabilitation); 4) COMMUNICATE with the team about how advance directives affect rehabilitation planning.

RESEARCH & EBP

213. 'Evidence synthesis hierarchy': from highest to lowest quality evidence, the correct order is:

A. Individual RCT → Systematic review → Anecdote

B. SYSTEMATIC REVIEW WITH META-ANALYSIS → RCT → Cohort study → Case-control study → Case series → Expert opinion/anecdote

C. Expert opinion → RCT → Meta-analysis

D. Case studies → RCT → Systematic review

✓ Answer: B

💡 **Rationale & Explanation:**

Evidence hierarchy: LEVEL 1: SYSTEMATIC REVIEW WITH META-ANALYSIS (synthesizes multiple RCTs; highest statistical power and generalizability). LEVEL 2: INDIVIDUAL RCT (randomized, controlled, prospective; minimizes most biases). LEVEL 3: COHORT STUDY (observational; follows a group over time). LEVEL 4: CASE-CONTROL STUDY (observational; compares cases with controls retrospectively). LEVEL 5: CASE SERIES AND CASE REPORTS (descriptive; no control group). LEVEL 6: EXPERT OPINION AND ANECDOTAL EVIDENCE (lowest quality; susceptible to cognitive bias). CLINICAL APPLICATION: base primary treatment decisions on Level 1-2 evidence when available; use Level 3-4 for conditions where RCTs are not feasible; recognize that Level 5-6 may be the only evidence for rare conditions or novel interventions.

├─ PROFESSIONAL PRACTICE

214. The 'PRC' (Professional Regulation Commission) is responsible for all EXCEPT:

A. Administering PT licensure examinations

B. Prescribing PT educational curriculum standards — this is the responsibility of the COMMISSION ON HIGHER EDUCATION (CHED), not the PRC; PRC administers the examination, while CHED sets the degree requirements and curriculum

C. Issuing certificates of registration

D. Disciplining licensed PTs

✓ **Answer: B**

💡 **Rationale & Explanation:**

PRC vs. CHED responsibilities: PRC (Professional Regulation Commission): administers the PT LICENSURE EXAMINATION; issues CERTIFICATES OF REGISTRATION and Professional Identification Cards; maintains the ROSTER OF REGISTERED PROFESSIONALS; disciplines licensed PTs; oversees the PBPT (Philippine Board of Physical Therapy). CHED (Commission on Higher Education): sets CURRICULUM STANDARDS for PT education (the Policies, Standards, and Guidelines — PSG for BS Physical Therapy); accredits PT programs; sets minimum requirements for faculty qualifications, facilities, and clinical training hours. Both agencies work together: CHED ensures graduates are well-prepared → PRC examines them → PRC registers those who pass. Understanding the distinction prevents common misattributions of regulatory authority.

├— ETHICS

215. The 'right to refuse treatment' for a capacitated adult patient:

A. Can be overridden if the PT believes the treatment is necessary

B. MUST BE RESPECTED even if the PT believes the treatment is in the patient's best interest — a capacitated adult's informed refusal of treatment is legally and ethically binding; the PT's role is to provide information, explore concerns, offer alternatives, document the refusal — NOT to coerce or override

C. Is limited to minor treatments only

D. Requires family agreement

✓ **Answer: B**

💡 **Rationale & Explanation:**

Right to refuse treatment: FUNDAMENTAL PATIENT RIGHT in both law and ethics. For a CAPACITATED ADULT who refuses PT: 1) EXPLORE the reason for refusal (pain, fear, misunderstanding, cultural factors, values

conflict); 2) PROVIDE COMPLETE INFORMATION about consequences of refusal; 3) OFFER ALTERNATIVES (different technique, modified approach, different goals); 4) DOCUMENT the refusal clearly (informed refusal documented is as important as informed consent); 5) RESPECT THE DECISION; 6) Communicate with the referring physician about the refusal. The PT may not agree — but cannot override a capacitated patient's refusal. Attempting to proceed despite refusal = BATTERY (unlawful touching) regardless of therapeutic intent.

├─ RESEARCH & EBP

216. 'Correlation does not equal causation': in a PT observational study showing that patients who attended MORE PT sessions had BETTER outcomes:

A. Attending more sessions caused better outcomes

B. This correlation could reflect CONFOUNDING — patients with better prognosis (less severe injury, younger age, higher motivation, better support systems) may BOTH attend more sessions AND have better outcomes; the increased sessions may not be the CAUSE of the better outcomes

C. Patients should always attend more sessions

D. PT is ineffective

✓ Answer: B

💡 Rationale & Explanation:

Correlation vs. causation and confounding: CONFOUNDING: a third variable (confounder) that is associated with BOTH the exposure (session attendance) and the outcome (recovery), creating a spurious correlation. EXAMPLE: more motivated, less severely injured patients → more likely to attend all sessions AND more likely to recover well. The correlation between session attendance and outcomes may reflect patient characteristics, not causation from PT. TO ESTABLISH CAUSATION: randomized controlled trial (randomly assign patients to different doses) eliminates confounding; or control for confounders

statistically in observational studies. PT PRACTICAL IMPLICATION: dose-response relationships in PT should be established through RCTs, not just observational correlations, before drawing causal conclusions.

├─ PROFESSIONAL PRACTICE

217. 'Occupational health physiotherapy' in the Philippine context includes:

A. Only treating sports injuries

B. WORKPLACE ERGONOMIC ASSESSMENT, PRE-EMPLOYMENT PHYSICAL EVALUATION, WORK-RELATED MUSCULOSKELETAL DISORDER (WMSD) PREVENTION PROGRAMS, RETURN TO WORK COORDINATION, AND HEALTH PROMOTION IN THE WORKPLACE — a growing subspecialty of PT in the Philippines as industrialization and desk-based work increase WMSD burden

C. Only hospital-based PT

D. Only geriatric care

✓ Answer: B

💡 **Rationale & Explanation:**

Occupational health PT in the Philippines: SCOPE: ergonomic assessment (workstation evaluation, posture analysis); pre-employment physical evaluation (fitness for work, no previous injury that would preclude safe work); WMSD PREVENTION (exercise programs for office workers, manual handling training, tool and equipment ergonomics); RETURN TO WORK COORDINATION (graded work exposure, modified duties, work hardening); HEALTH PROMOTION (wellness programs, ergonomics education, physical activity promotion). GROWING NEED: BPO industry in the Philippines (millions of call center workers) has high neck, shoulder, and upper extremity WMSD rates — occupational PT is in high demand. OPPORTUNITIES: PTs in OH settings often work as consultants to companies or within occupational health clinics.

ETHICS

218. 'Nonmaleficence' in PT: a PT prescribes a home exercise program that causes worsening pain. The ethical obligation is:

A. Continue the same program

B. IMMEDIATELY REASSESS — worsening pain is a signal that the treatment may be CAUSING HARM; the PT must: identify the cause (inappropriate exercise, wrong dosage, incorrect technique, red flag condition); modify or discontinue the offending exercise; ensure appropriate pain management; document the adverse response and clinical reasoning

C. Increase the exercise dose

D. Only monitor without action

✓ Answer: B

💡 **Rationale & Explanation:**

Nonmaleficence and exercise prescription: PRIMUM NON NOCERE (first, do no harm): worsening pain after an exercise program requires IMMEDIATE REASSESSMENT. POSSIBLE CAUSES: inappropriate exercise type (e.g., extension exercises for a patient with kyphosis who needed flexion); excessive dosage (too many reps, too much load, too little recovery); incorrect technique (compensatory movement patterns causing new stress); RED FLAG not identified (serious pathology causing the pain — malignancy, fracture, cord compression). PT ACTIONS: 1) Stop or modify the offending exercise immediately; 2) Reassess the diagnosis and clinical reasoning; 3) Check for red flags; 4) Modify the program based on findings; 5) Document the adverse response and actions taken; 6) Communicate with the referring physician if a red flag is identified.

RESEARCH & EBP

219. 'Minimal Detectable Change' (MDC) differs from MCID in that:

A. They are the same concept

B. MDC represents the minimum change EXCEEDING MEASUREMENT ERROR (statistical threshold — above this level, the change is REAL and not due to measurement noise); MCID is the minimum change that is CLINICALLY MEANINGFUL to the patient — a change can exceed MDC (real) but be below MCID (not clinically important)

C. MCID is always larger than MDC

D. MDC is always larger than MCID

✓ Answer: B

💡 Rationale & Explanation:

MDC vs. MCID: MDC (Minimal Detectable Change) = the smallest change that exceeds the inherent measurement error of the tool at a given confidence level (typically 95% CI): $MDC_{95} = 1.96 \times SEM \times \sqrt{2}$. A change below the MDC could be due to MEASUREMENT ERROR (the tool is not precise enough to detect that change). MCID (Minimal Clinically Important Difference) = the smallest change that is CLINICALLY MEANINGFUL and IMPORTANT TO THE PATIENT — determined through patient-reported outcome research. RELATIONSHIP: MDC must be EXCEEDED before you can claim the change is REAL; MCID must be exceeded before you can claim it is CLINICALLY IMPORTANT. Ideally: MDC < MCID (the tool can detect real changes before they reach clinical importance). When MDC > MCID: the tool is too imprecise to detect clinically important changes — choose a different outcome measure.

├— PROFESSIONAL PRACTICE

220. The 'Philippine Data Privacy Act' (RA 10173) requires healthcare providers to notify patients of a data breach within:

A. 1 month

B. 72 HOURS of discovering a breach involving sensitive personal information — and notify the National Privacy Commission; sensitive personal information includes health records, medical history, and rehabilitation records

C. 1 year

D. Only when the patient asks

✓ Answer: B

💡 **Rationale & Explanation:**

RA 10173 breach notification: NOTIFICATION REQUIREMENTS: within 72 HOURS of discovering a PERSONAL DATA BREACH involving sensitive personal information (health data is classified as SENSITIVE personal information under RA 10173): 1) NOTIFY the NATIONAL PRIVACY COMMISSION (NPC); 2) NOTIFY the AFFECTED INDIVIDUALS directly. BREACH EXAMPLES: unauthorized access to PT electronic records (hacked EMR); paper records lost or stolen; inadvertent disclosure of patient data to unauthorized parties. SECURITY MEASURES required BEFORE a breach: access controls; encryption for electronic records; secure storage for paper records; staff training on data privacy. NON-COMPLIANCE: administrative fines up to Php 5 million + possible criminal penalties for WILLFUL breach. PT clinics must have a DATA BREACH RESPONSE PLAN even before any breach occurs.

├─ ETHICS

221. 'Autonomy vs. beneficence' conflict: a patient with severe COPD who continues to smoke despite PT counseling — the PT's ethical obligation is:

A. Stop treating the patient for non-compliance

B. Continue providing PT while REPEATEDLY OFFERING EVIDENCE-BASED SMOKING CESSATION COUNSELING and REFERRAL — but ultimately RESPECT THE PATIENT'S AUTONOMOUS CHOICE; withholding PT as punishment for non-compliance violates both beneficence and non-abandonment principles

C. Ignore the smoking completely

D. Report the patient to health authorities

✓ **Answer: B**

💡 **Rationale & Explanation:**

Autonomy vs. beneficence in smoking cessation: CONFLICT: the patient has the autonomous right to smoke (legal activity); the PT has a beneficence duty to promote health (smoking worsens COPD). RESOLUTION: 1) At EVERY PT session: briefly offer evidence-based cessation information; provide written resources; offer referral to a smoking cessation program; use motivational interviewing techniques (explore readiness to change); 2) NEVER WITHHOLD PT as punishment — this would harm the patient (worse COPD outcomes without PT) while failing to change smoking behavior; 3) DOCUMENT all cessation counseling attempts and the patient's response; 4) RESPECT THE DECISION: if the patient consistently refuses, accept this and continue PT; 5) REFLECT: has the PT explored all barriers to quitting (addiction, stress, financial, cultural factors)?

├─ RESEARCH & EBP

222. 'Systematic review quality assessment': the 'CASP tool' (Critical Appraisal Skills Programme) evaluates which elements?

A. Only sample size

B. THE VALIDITY (was the study done correctly?), RESULTS (what are the results?), AND RELEVANCE (will the results help locally?) — for RCTs, CASP assesses: clear research question, randomization quality, blinding, completeness of follow-up, similarity of groups at baseline, equal treatment except for the intervention, statistical analysis appropriateness, and applicability

C. Only statistical methods

D. Only outcome measures

✓ **Answer: B**

💡 **Rationale & Explanation:**

CASP Critical Appraisal Tool: structured checklist for evaluating research quality. FOR RCTs (11 questions): Was there a clear question? Was randomization truly random? Were participants blind? Were researchers blind? Were all participants accounted for? Were participants analyzed in their original groups? Were groups similar at baseline? Equal treatment except for the intervention? What are the results (effect size, CI, p-value)? How precise are the results (CI width)? Can the results be applied to local population? CASP TOOLS exist for: RCTs, systematic reviews, qualitative research, cohort studies, case-control studies, diagnostic test studies, economic evaluations. Philippine PT students conducting literature reviews or EBP projects should use appropriate CASP tools to appraise the studies they are applying to clinical questions.

├— PROFESSIONAL PRACTICE

223. 'Telehealth PT' is most appropriate for which type of PT service?

A. Manual therapy

B. EXERCISE INSTRUCTION AND PROGRESSION, HOME EXERCISE PROGRAM REVIEW AND MODIFICATION, PATIENT EDUCATION AND COUNSELING, FUNCTIONAL MOVEMENT ASSESSMENT via video, ADHERENCE MONITORING, AND GOAL REVIEW — these services can be effectively delivered without physical contact; manual therapy, physical modality application, and detailed palpation require in-person attendance

C. Physical modality application

D. Palpation-dependent assessments

✓ **Answer: B**

💡 **Rationale & Explanation:**

Appropriate telehealth PT services: APPROPRIATE: exercise prescription and monitoring (patient performs; PT coaches via video);

home exercise program review (patient demonstrates; PT observes and provides feedback); patient education (anatomy, physiology, activity guidelines, pain science); motivational support (goal review, adherence coaching); functional movement assessment (squat, gait analysis, balance tests via video — limited but informative); communication with family and caregivers. NOT APPROPRIATE VIA TELEHEALTH: manual therapy (requires physical contact); detailed palpation; physical modality application (US, TENS, etc.); initial complex musculoskeletal assessment requiring hands-on examination; patients with significant cognitive impairment (cannot manage the technology or interpret instructions safely).

ETHICS

224. The 'principle of veracity' in PT practice requires:

A. Only positive information to patients

B. TRUTHFUL, ACCURATE, AND COMPLETE COMMUNICATION with patients — including honest disclosure of: what PT can and cannot achieve, realistic prognosis, treatment side effects, professional uncertainty, professional limitations, and adverse events that occur during care

C. Only disclosing what patients ask

D. Withholding negative prognosis

✓ Answer: B

💡 Rationale & Explanation:

Veracity: TRUTHFULNESS is a core professional virtue. APPLICATIONS: PROGNOSIS: provide a realistic assessment even if it is not what the patient hopes to hear; avoid false reassurance; can provide hope while being honest about uncertainty. TREATMENT LIMITATIONS: honestly represent what evidence says about expected outcomes; do not exaggerate effectiveness. ADVERSE EVENTS: if a mistake or adverse event occurs, disclose it to the patient (the principle of 'open disclosure' or 'duty to disclose'). PROFESSIONAL LIMITATIONS:

acknowledge when a condition is beyond your expertise and requires referral. UNCERTAINTY: acknowledge when you don't know something rather than guessing. Why veracity matters: it BUILDS TRUST (the therapeutic relationship); it ENABLES AUTONOMOUS DECISION-MAKING (patients can't make informed decisions with false information); it is a LEGAL REQUIREMENT (fraudulent misrepresentation of outcomes is actionable).

├— RESEARCH & EBP

225. 'Number Needed to Treat' (NNT) is clinically more useful than relative risk reduction because:

A. NNT is easier to calculate

B. NNT directly tells the CLINICIAN HOW MANY PATIENTS MUST BE TREATED for ONE PATIENT TO BENEFIT — it accounts for the baseline risk and is directly interpretable in clinical terms (NNT=5 means treat 5 patients to benefit 1; NNT=100 means treat 100 patients to benefit 1)

C. RRR is always more accurate

D. NNT only applies to drug trials

✓ Answer: B

💡 **Rationale & Explanation:**

NNT clinical interpretation: NNT = 1 / ARR (absolute risk reduction). EXAMPLE 1: Exercise prevents falls in 30% of patients (NNT = 1/0.30 = 3.3 — treat approximately 3 patients to prevent one fall). EXAMPLE 2: A supplement reduces fractures from 2% to 1% (ARR = 1%, NNT = 100 — treat 100 patients to prevent one fracture). COMPARISON: the 'impressive' RRR of 50% in Example 2 hides the POOR NNT of 100. NNT INTERPRETATION: NNT <5 = excellent (treatment highly efficient); NNT 5-15 = good; NNT >50 = poor efficiency (many patients treated to benefit one). For PT interventions: good NNT values support widespread implementation; poor NNT values require consideration of cost, burden, and harms (NNH — Number Needed to Harm).

PROFESSIONAL PRACTICE

226. The 'PT rehabilitation plan of care' must be REVIEWED AND UPDATED when:

A. Never — the initial plan is always followed

B. WHEN THE PATIENT'S CONDITION CHANGES (improvement or deterioration), goals are achieved, new clinical findings emerge, the patient's preferences change, or the planned timeframe has elapsed without adequate progress — failure to reassess and update the plan is substandard documentation and care

C. Only at discharge

D. Only when the physician requests it

✓ Answer: B

💡 **Rationale & Explanation:**

Plan of care reassessment triggers: FORMAL REASSESSMENT REQUIRED: 1) When the patient ACHIEVES A GOAL (update to new goals); 2) When the patient FAILS TO PROGRESS after 3-6 sessions (reconsider diagnosis, modify intervention, consider referral); 3) When a NEW SYMPTOM or RED FLAG appears; 4) When the patient's condition significantly WORSENS; 5) When the patient CHANGES THEIR GOALS or priorities; 6) At the end of a planned treatment EPISODE (discharge or re-evaluation); 7) When the patient has been away from PT for an extended period (injury, illness, travel). DOCUMENTATION: each reassessment must be documented in a PROGRESS NOTE or FORMAL REASSESSMENT NOTE including: objective findings, comparison to previous measurements, progress toward goals, updated plan. Regular reassessment is both a clinical quality standard AND a documentation requirement.

ETHICS

227. 'Non-abandonment' in PT practice means:

A. The PT can never discharge a patient

B. The PT must not ABRUPTLY WITHDRAW care from a vulnerable patient who still has therapeutic needs — if a PT must stop treating a patient (job change, scheduling), they must provide REASONABLE NOTICE, assist with TRANSITION TO ANOTHER PROVIDER, and ensure CONTINUITY OF CARE

C. The PT must treat all patients for free

D. The PT cannot take vacation

✓ Answer: B

💡 Rationale & Explanation:

Non-abandonment in PT: ABANDONMENT: abruptly stopping care for a patient without notice and without ensuring continued care — this is BOTH UNETHICAL and potentially NEGLIGENCE. LEGITIMATE REASONS to stop care: PT moves to a different job; patient has achieved their goals; patient is non-compliant despite education and alternatives; patient relocates; end of funding. ETHICAL OBLIGATIONS when stopping: 1) ADEQUATE NOTICE: the longer the patient has been in care and the more dependent they are, the more notice required; 2) TRANSITION ASSISTANCE: provide referrals to other appropriate providers; write a discharge summary for the new provider; 3) EMERGENCY PROVISION: if the patient is in an acute care phase, ensure coverage during the transition. NON-ABANDONMENT does NOT mean the PT cannot discharge a patient when goals are met or when treatment is no longer indicated — it means proper procedures must be followed.

├─ RESEARCH & EBP

228. 'Narrative review' vs. 'systematic review': the KEY methodological advantage of a systematic review is:

A. Systematic reviews are longer

B. SYSTEMATIC REVIEWS USE EXPLICIT, REPRODUCIBLE METHODOLOGY — a defined search strategy, inclusion/exclusion criteria, quality appraisal, and synthesis approach — minimizing BIAS that is inherent in narrative reviews (where the author selects and interprets studies without transparent methodology)

C. Narrative reviews use databases

D. Systematic reviews always include meta-analysis

✓ Answer: B

💡 **Rationale & Explanation:**

Systematic vs. narrative review: NARRATIVE (traditional) review: author selects studies based on their own judgment; methods not explicitly stated; susceptible to CONFIRMATION BIAS (author selects studies supporting their pre-existing view); NOT REPRODUCIBLE (different authors reviewing the same literature might reach different conclusions). SYSTEMATIC REVIEW: PRE-DEFINED SEARCH STRATEGY (specific databases, search terms, date limits); EXPLICIT INCLUSION/EXCLUSION CRITERIA; QUALITY APPRAISAL of included studies; TRANSPARENT SYNTHESIS (how were results combined?); REPRODUCIBLE (another researcher following the same methods should reach similar results). The systematic review is considered the gold standard for synthesizing research evidence because of its explicit, reproducible methodology that minimizes selection bias.

├— PROFESSIONAL PRACTICE

229. The 'PAPT Special Interest Groups' (SIGs) currently include all EXCEPT:

A. Musculoskeletal PT SIG

B. Pharmaceutical PT SIG — pharmacology is outside the scope of PT practice; PAPT SIGs focus on PT subspecialties within the defined scope of practice

C. Neurological PT SIG

D. Cardiopulmonary PT SIG

✓ **Answer: B**

💡 **Rationale & Explanation:**

PAPT Special Interest Groups: established PAPT SIGs include: MUSCULOSKELETAL PT (orthopaedic, sports, manual therapy); NEUROLOGICAL PT (stroke, TBI, SCI, PD rehabilitation); CARDIOPULMONARY PT (cardiac rehab, pulmonary rehab, ICU PT); SPORTS PT (sports injuries, sports performance, return to sport); PEDIATRIC PT (CP, developmental disabilities, pediatric rehabilitation); WOMEN'S HEALTH PT (pelvic floor, pregnancy, postpartum); GERIATRIC PT (falls prevention, age-related conditions, long-term care); COMMUNITY AND PREVENTIVE PT (CBR, public health PT). NOT A PAPT SIG: pharmaceutical PT — this is outside PT scope of practice (drug prescription belongs to medicine/pharmacy). Understanding the PAPT SIGs helps Filipino PTs identify their areas of professional interest and CPD pathways.

ETHICS

230. The 'surrogate decision-maker' for an incapacitated patient in the Philippines is typically:

A. The PT

B. In hierarchical order: SPOUSE, ADULT CHILDREN, PARENTS, ADULT SIBLINGS, then other close family members — consistent with Philippine cultural family-centered values and the Civil Code's provisions on family decision-making; formal healthcare proxy documents are not yet widely used in the Philippines

C. The hospital administrator

D. The insurance company

✓ **Answer: B**

💡 **Rationale & Explanation:**

Surrogate decision-making in the Philippines: Philippine law and culture emphasizes FAMILY-CENTERED DECISION-MAKING. In the absence of a formal advance directive or healthcare proxy document: SPOUSE (first decision-maker); ADULT CHILDREN (next); PARENTS (next); ADULT SIBLINGS (next); OTHER CLOSE FAMILY. PT ROLE: identify the appropriate surrogate decision-maker; ensure they have adequate information; involve them in rehabilitation goal-setting; communicate the patient's known preferences and values (even if not formally documented). CULTURAL SENSITIVITY: in Filipino culture, family decision-making is the NORM, not the exception — patients often expect and prefer family involvement in healthcare decisions. PT should facilitate this involvement while still centering the patient's known values and preferences.

├─ RESEARCH & EBP

231. 'Critical appraisal' of a PT RCT: the most IMPORTANT quality criterion is:

A. Sample size

B. ALLOCATION CONCEALMENT — whether the randomization sequence was truly hidden from the person enrolling participants; if allocation can be predicted, selection bias corrupts the randomization, undermining the entire RCT design; even a published randomization scheme is inadequate if the enrolling clinician can determine the group assignment before enrollment

C. The journal's impact factor

D. Number of outcome measures

✓ Answer: B

💡 Rationale & Explanation:

Allocation concealment (critical appraisal): in an RCT, the random group assignment (the SEQUENCE) must be generated AND CONCEALED from the person enrolling participants until after enrollment is complete. WHY: if the enrolling clinician knows that the

next patient will be in the CONTROL GROUP, they may selectively NOT enroll that patient (enroll only the 'good candidates' for the treatment group) → SELECTION BIAS → the treatment group is systematically different from the control group → BREAKS RANDOMIZATION. ADEQUATE CONCEALMENT: central telephone/web randomization (most secure); sealed opaque envelopes (moderately secure). INADEQUATE: open assignment lists; transparent envelopes; alternating assignment; assignment by hospital number. Studies with INADEQUATE allocation concealment overestimate treatment effects by ~20-30% on average.

├─ PROFESSIONAL PRACTICE

232. The 'BSPT curriculum' in the Philippines is governed by:

A. PRC regulations

B. CHED (Commission on Higher Education) through the Policies, Standards, and Guidelines (PSG) for BS Physical Therapy — setting minimum requirements for: curriculum content, clinical training hours, faculty qualifications, and facilities

C. PAPT regulations

D. DOH regulations

✓ Answer: B

💡 **Rationale & Explanation:**

CHED governance of BSPT education: COMMISSION ON HIGHER EDUCATION (CHED) issues POLICIES, STANDARDS, AND GUIDELINES (PSG) for each degree program. PSG FOR BS PHYSICAL THERAPY specifies: CURRICULUM: required subjects (anatomy, physiology, kinesiology, pathology, clinical PT subjects, professional practice, research); CLINICAL TRAINING: minimum 1,000+ hours of supervised clinical internship; FACULTY QUALIFICATIONS: minimum academic and clinical experience requirements for PT faculty; FACILITIES: laboratory requirements (PT laboratory with equipment), clinical training affiliates. INSTITUTIONAL ACCREDITATION: PT programs are accredited

by CHED-recognized accrediting bodies (PAASCU, ACSCU, ACPET). PRC examines graduates of CHED-accredited programs; CHED does not administer the licensure examination.

ETHICS

233. 'Professional integrity' requires the PT to acknowledge:

A. Only positive outcomes to patients

B. PROFESSIONAL UNCERTAINTY, LIMITATIONS, AND MISTAKES — including acknowledging when a diagnosis is uncertain, when PT evidence is limited, when the patient is not improving as expected, and when an error has occurred; integrity also means not misrepresenting qualifications or claiming expertise the PT does not have

C. Only what the patient wants to hear

D. Expertise in all areas of PT

✓ Answer: B

💡 **Rationale & Explanation:**

Professional integrity: ACKNOWLEDGING UNCERTAINTY: telling a patient 'I'm not sure what is causing your pain — let me refer you for further assessment' is MORE HONEST and professionally STRONGER than confidently stating an incorrect diagnosis. ACKNOWLEDGING LIMITATIONS: 'This condition requires a specialist PT in pelvic floor rehabilitation — I can refer you to someone who has that expertise.' ACKNOWLEDGING MISTAKES: open disclosure of adverse events and errors is both ethically required and shown to BUILD patient trust (counterintuitively, patients respond better to honest disclosure than to cover-ups). MISREPRESENTATION: claiming specializations or certifications the PT does not have is fraud; claiming extensive experience the PT does not have is both unethical and potentially negligent. Integrity is the foundation of professional trustworthiness.

RESEARCH & EBP

234. 'Qualitative research' in PT generates knowledge about:

A. Drug dosages

B. The LIVED EXPERIENCE, PERCEPTIONS, BELIEFS, AND CONTEXTUAL FACTORS of patients and clinicians — answering 'HOW' and 'WHY' questions that quantitative research cannot address; e.g., why do patients not adhere to home exercise programs? what is it like to live with chronic pain? how do PTs make clinical decisions?

C. Only statistical relationships

D. Only biomechanical data

✓ Answer: B

💡 **Rationale & Explanation:**

Qualitative research in PT: METHODS: semi-structured interviews; focus groups; participant observation; document analysis; diary studies. ANALYSIS: thematic analysis; grounded theory; phenomenology; content analysis; interpretive phenomenological analysis. EXAMPLES: 'What are patients' experiences of returning to sport after ACL reconstruction?' (phenomenological study); 'Why do elderly patients decline fall prevention programs?' (grounded theory study); 'How do PTs integrate evidence-based practice in clinical decision-making?' (ethnographic study). QUALITY CRITERIA: credibility (trustworthiness); transferability (applicability); dependability (consistency); confirmability (neutrality) — analogous to validity, external validity, reliability, and objectivity in quantitative research. Qualitative findings can explain quantitative findings and guide the design of better RCTs.

PROFESSIONAL PRACTICE

235. The 'PT Code of Ethics' — a PT working in a setting where they observe an unethical practice by a colleague should:

A. Ignore it to maintain workplace harmony

B. ADDRESS IT — through INTERNAL REPORTING CHANNELS first (supervisor, department head, hospital ethics committee), then EXTERNAL CHANNELS (PRC, PAPT, DOH) if internal channels fail or if the situation is serious and urgent; document everything and protect yourself from retaliation

C. Report directly to media

D. Confront the colleague publicly

✓ Answer: B

💡 **Rationale & Explanation:**

Reporting unethical practices: INTERNAL FIRST: most institutions have a chain of command and internal reporting mechanisms — starting internally is appropriate for most situations and allows the institution to self-correct. EXTERNAL WHEN: the unethical practice is serious (patient harm is occurring); internal channels have been ineffective; there is a conflict of interest with the internal process (the unethical practitioner IS the supervisor); the situation involves criminal conduct. DOCUMENTATION: document every step — when you observed the practice, what you saw/heard, to whom you reported, what response you received. PROTECTION: Philippine whistleblower protections are developing — document everything; consult PAPT or legal counsel if you face retaliation. PATIENT SAFETY comes first — even when reporting is professionally or personally uncomfortable.

├─ RESEARCH & EBP

236. 'Generalizability' (external validity) is MOST LIMITED when:

A. A study uses a large sample

B. The study uses a HIGHLY SELECTED PATIENT POPULATION (excluding common comorbidities, limited age range, only recruited from tertiary hospitals) or IDEAL TREATMENT CONDITIONS (unusually skilled therapists, unlimited sessions, high-cost equipment not available in

most settings) — making it difficult to apply findings to real-world practice

C. Randomization is used

D. The study is published in a good journal

✓ Answer: B

💡 **Rationale & Explanation:**

Factors limiting generalizability: PATIENT SELECTION: RCTs often exclude: elderly patients (>75 years); those with multiple comorbidities; those with mild/severe versions of the condition (recruit only moderate severity); non-English speakers; those with low literacy. If your patient is elderly with multiple comorbidities, an RCT conducted on 35-55-year-olds with isolated conditions may not apply. SETTING: university hospital RCTs conducted by expert PT researchers may not represent what a typical community PT can achieve. INTERVENTION DELIVERY: some RCTs use highly specialized, intensive protocols that are impractical in real-world settings (e.g., 60 hours of CIMT by a specialized team vs. what a general neurological PT can deliver). BEFORE APPLYING EVIDENCE: ask 'Is my patient similar to the study participants? Can I deliver the treatment as it was done in the study?'

├— PROFESSIONAL PRACTICE

237. The 'Magna Carta for Persons with Disability' (RA 7277) is relevant to PT because:

A. Only for orthopedic PT

B. It DEFINES DISABILITY, ESTABLISHES RIGHTS OF PERSONS WITH DISABILITIES (PWDs), and requires REASONABLE ACCOMMODATION AND BARRIER-FREE ACCESS to services including healthcare — PT has a professional obligation to advocate for these rights and to provide accessible, non-discriminatory services to PWDs

C. Only for mental health PT

D. Only for pediatric PT

✓ **Answer: B**

💡 **Rationale & Explanation:**

RA 7277 Magna Carta for PWDs and PT: DEFINITION: physical, mental, or sensory impairment that limits participation. RIGHTS ESTABLISHED: accessibility of physical environments (ramps, doorways, facilities); accessibility of services (healthcare, education, employment); equal opportunity; non-discrimination. PT OBLIGATIONS: 1) ACCESSIBLE FACILITIES: advocate for barrier-free PT departments (ramps, accessible treatment tables, adaptive equipment); 2) ACCESSIBLE SERVICES: modify assessment and treatment approaches for patients with additional disabilities; 3) ADVOCACY: as clinicians, PTs are in a position to identify and advocate for removing barriers that impede PWD access; 4) DISABILITY CERTIFICATION: PTs may be involved in assessments used for PWD identification cards (for government benefits and discounts). PT practice should EMBODY the principles of the Magna Carta — equal access and non-discrimination for all patients.

├— RESEARCH & EBP

238. 'Pilot study' in PT research serves to:

A. Replace the main RCT

B. TEST FEASIBILITY of the research procedures, ESTIMATE EFFECT SIZE for sample size calculation, REFINE ASSESSMENT PROCEDURES, and IDENTIFY LOGISTICAL CHALLENGES before conducting a full-scale RCT — NOT to provide definitive evidence of treatment efficacy

C. Provide definitive evidence

D. Only test the statistical analysis

✓ **Answer: B**

💡 **Rationale & Explanation:**

Pilot study purposes: FEASIBILITY TESTING: can we recruit enough participants? Are the assessment procedures acceptable to participants? Is the intervention deliverable as planned? Is randomization feasible in this setting? EFFECT SIZE ESTIMATION: the pilot provides a preliminary estimate of the treatment effect → used to calculate the SAMPLE SIZE required for the full RCT (how many patients needed to detect this effect with 80% power). PROCEDURE REFINEMENT: identify problems with questionnaires, timing, blinding, or data collection before they affect the main trial. NOT for EFFICACY: a pilot study is typically too small to reliably detect treatment effects — reporting a 'significant result' from a pilot as evidence of efficacy is a common misuse. PHILIPPINE PT RESEARCH: pilot studies are appropriate for graduate students and early-career researchers — they generate preliminary data for grant applications and larger collaborative studies.

ETHICS

239. 'Reproductive rights and PT': when a pregnant patient asks the PT to apply ultrasound to their lower back:

A. Apply US without concern

B. DECLINE to apply US over the LUMBAR SPINE, ABDOMEN, OR PELVIS during pregnancy — even though the evidence for harm is limited, therapeutic US over the pregnant uterus is an ABSOLUTE CONTRAINDICATION; offer ALTERNATIVE safe treatments (manual therapy to thoracic spine, modified exercise, heat to upper back, posture education) while explaining the limitation

C. Ask the physician first

D. Apply only if the patient insists

✓ Answer: B

💡 Rationale & Explanation:

US in pregnancy contraindication: therapeutic US is ABSOLUTELY CONTRAINDICATED over or near the PREGNANT UTERUS regardless of

gestational age. RATIONALE: thermal and mechanical effects of therapeutic US may potentially: affect fetal development (especially in the first trimester); cause placental changes; affect amniotic fluid temperature. The FDA has NOT approved therapeutic US for use on pregnant women. IMPORTANT DISTINCTION: DIAGNOSTIC OBSTETRIC ULTRASOUND (fetal imaging) uses much lower intensities than therapeutic US and is considered safe — do NOT confuse these. ALTERNATIVES for lumbar pain in pregnancy: thoracic spine mobilization; pelvic girdle joint mobilization (non-US techniques); aquatic exercises; modified Pilates/core stability; posture education; supportive belts; ice for acute pain. PT can effectively manage pregnancy-related musculoskeletal pain without US.

├— PROFESSIONAL PRACTICE

240. The 'PT annual registration' requirement (PTR — Professional Tax Receipt):

A. Is the same as the PRC ID

B. Is a SEPARATE ANNUAL REQUIREMENT under the Local Government Code — the PTR confirms that the PT has paid the local professional tax for the current year; it is required when PRACTICING PT for the year and when signing official PT documents (the PTR number is often required alongside the PRC registration number on official documents)

C. Is only for government employees

D. Is obtained from the PRC only

✓ Answer: B

💡 Rationale & Explanation:

Professional Tax Receipt (PTR): issued by the LOCAL GOVERNMENT UNIT (LGU — city or municipality) where the PT practices annually. BASED ON: Local Government Code (RA 7160) which requires professionals to pay annual professional tax. REQUIRED WHEN: actively practicing PT in any given year; signing official clinical documents (both PRC registration number AND current PTR number

may be required). PROCESS: pay at the City/Municipal Treasurer's Office; present the previous year's PTR and PRC ID; receive the new year's PTR receipt and number. DISTINCTION: PRC REGISTRATION = lifetime; renewed every 3 years; national. PTR = ANNUAL; local; per LGU where you practice. A PT practicing in multiple LGUs may need multiple PTR registrations.

├─ RESEARCH & EBP

241. 'Intention to treat analysis' handles MISSING DATA primarily by:

A. Excluding missing data entirely

B. Using statistical methods such as LAST OBSERVATION CARRIED FORWARD (LOCF), MULTIPLE IMPUTATION, or MIXED-MODELS for REPEATED MEASURES — these methods impute the missing data or use all available data without excluding participants; excluding missing data is 'per-protocol' analysis, not ITT

C. Using only complete cases

D. Replacing with the group mean

✓ Answer: B

💡 **Rationale & Explanation:**

ITT and missing data: TRUE ITT analysis: analyzes ALL RANDOMIZED PARTICIPANTS in their originally assigned groups regardless of compliance or dropout. MISSING DATA CHALLENGES: dropouts, protocol deviations, and lost-to-follow-up create missing data that must be handled without excluding participants. STATISTICAL APPROACHES: LOCF (Last Observation Carried Forward): the patient's last measured value is carried forward as if they didn't change — conservative but assumes no deterioration after dropout; MULTIPLE IMPUTATION: statistical technique that creates multiple plausible datasets with estimated missing values based on observed data patterns, then pools results — the modern preferred approach; MIXED MODELS FOR REPEATED MEASURES: uses all available data points from each patient without requiring complete data. SENSITIVITY ANALYSIS:

compare results using different missing data handling methods to test whether the conclusion is robust.

PROFESSIONAL PRACTICE

242. 'Documentation of adverse events' in PT: an adverse event that occurs during PT treatment must be:

A. Ignored if minor

B. DOCUMENTED IMMEDIATELY — description of the event (what happened, when, where), the patient's condition before and after, immediate actions taken, PT's clinical assessment and judgment, notification of the physician or supervisor, and any follow-up plan; also reported through the institutional adverse event reporting system

C. Only documented at discharge

D. Only reported if the patient complains

✓ Answer: B

💡 Rationale & Explanation:

Adverse event documentation in PT: IMMEDIATE DOCUMENTATION: document the event AS SOON AS POSSIBLE after it occurs (while details are fresh). REQUIRED CONTENT: Date, time, location; Patient's condition BEFORE the event; What HAPPENED (objective description — not interpretation); Patient's condition AFTER; IMMEDIATE ACTIONS TAKEN (first aid, notification, clinical assessment); Physician/supervisor NOTIFICATION and their response; FOLLOW-UP PLAN. INSTITUTIONAL REPORTING: most hospitals have an INCIDENT REPORT FORM — complete this in addition to the clinical note. WHY DOCUMENT: legal protection for the PT (documents what actions were taken); quality improvement (identifies patterns); continuity of care (subsequent providers know what occurred). Common adverse events in PT: patient falls during gait training; burns from modalities; worsening pain after manipulation; hypotension during exercise.

ETHICS

243. 'Truth telling' (veracity) about prognosis: a patient with severe TBI asks the PT if they will ever walk again. The ethically appropriate response is:

A. 'You will definitely walk again'

B. An HONEST, COMPASSIONATE RESPONSE acknowledging uncertainty while providing hope based on realistic evidence — e.g., 'Based on current evidence and your progress, I believe meaningful recovery is possible, though I can't promise complete return to your previous function. What we see in the next 3-6 months of rehabilitation will help us understand your potential better. My job is to maximize your recovery — let's focus on today's session and what we can achieve together'

C. 'You will never walk'

D. Silence and avoidance of the question

✓ Answer: B

💡 **Rationale & Explanation:**

Truth telling about prognosis in TBI: COMPONENTS OF THE ETHICAL RESPONSE: 1) HONESTY: acknowledge genuine uncertainty; do not make promises you cannot keep (prognosis in TBI is genuinely uncertain in many cases); 2) EVIDENCE-BASED: draw on what is known about TBI recovery and the patient's specific presentation; 3) HOPE: genuine hope is based on realistic possibilities, not on false reassurance; 4) FOCUS ON WHAT CAN BE CONTROLLED: redirect to the rehabilitation process and what intensive effort can achieve; 5) COMPASSION: acknowledge the emotional weight of the question. FALSE HOPE is ultimately harmful (the patient makes life decisions based on false expectations) and erodes trust when reality diverges from promises. TRUE HOPE is the possibility of meaningful improvement — which is often real in TBI rehabilitation.

RESEARCH & EBP

244. The 'GRADE' strength of recommendation is CONDITIONAL/WEAK when:

A. The evidence is of high quality

B. The EFFECTS are CLOSELY BALANCED (benefits and harms are approximately equal, or the quality of evidence is low to moderate, or patient values and preferences vary substantially) — meaning different patients might reasonably choose different courses of action

C. Only expert opinion supports it

D. The intervention has no evidence

✓ Answer: B

💡 **Rationale & Explanation:**

GRADE conditional/weak recommendation: STRONG RECOMMENDATION (we recommend): desirable effects clearly outweigh undesirable effects; consistent evidence; patient values vary little; implementation is clearly justified. CONDITIONAL/WEAK RECOMMENDATION (we suggest): 1) Benefits and harms CLOSELY BALANCED — it is a reasonable choice for some patients but not all; 2) LOW QUALITY evidence (further research likely to change our estimate); 3) WIDE VARIATION in patient values (some patients will strongly prefer the intervention; others will not); 4) Cost or resource implications make it worth considering carefully. CLINICAL INTERPRETATION: a CONDITIONAL recommendation means: 'the intervention is appropriate for many patients, but consider individual patient circumstances, values, and preferences before routinely applying it.' NOT the same as 'don't do it' — it means 'use clinical judgment.'

PROFESSIONAL PRACTICE

245. The PT's role in 'IPR (Interprofessional Rehabilitation)' team meetings:

A. Only to listen and follow physician instructions

B. To CONTRIBUTE CLINICAL EXPERTISE in physical function, movement dysfunction, and rehabilitation potential — presenting PT assessment findings, proposing PT goals, advocating for PT treatment time and resources, coordinating with OT (overlapping functional goals), SLP, nursing, and social work — and ACTIVELY PARTICIPATE IN JOINT DECISION-MAKING

C. To manage medications

D. To perform medical diagnosis

✓ Answer: B

💡 **Rationale & Explanation:**

PT in IPR team meetings: the PT is an EQUAL PROFESSIONAL PARTNER in the rehabilitation team, not a subordinate to the physician. PT CONTRIBUTIONS: 1) Present PT ASSESSMENT FINDINGS (FIM motor items, balance and gait tests, UE function, ADL performance); 2) Propose PT GOALS (aligned with patient goals, realistic based on assessment); 3) Recommend PT TREATMENT INTENSITY (frequency, duration, type); 4) ADVOCATE for PT resources (appropriate scheduling, adequate session length); 5) COORDINATE with OT (functional overlap areas — sitting tolerance, transfers, functional reach); 6) Communicate PT-relevant social information (home environment, family support, patient motivation). The PT's clinical expertise in movement is unique and irreplaceable — active contribution to team decisions produces better outcomes than passive compliance with physician decisions.

├— RESEARCH & EBP

246. The 'Cochrane Collaboration' is significant to PT because:

A. It is a pharmaceutical company

B. It produces HIGH-QUALITY SYSTEMATIC REVIEWS of healthcare interventions that are freely accessible to clinicians worldwide — Cochrane reviews are widely considered the highest quality systematic reviews and are a primary source of evidence for PT clinical practice guideline development

C. It certifies PT clinicians

D. It administers licensing examinations

✓ Answer: B

💡 **Rationale & Explanation:**

Cochrane Collaboration in PT: the Cochrane Collaboration produces COCHRANE SYSTEMATIC REVIEWS — widely considered the gold standard for healthcare systematic reviews. COCHRANE LIBRARY: freely accessible in many countries; Cochrane Reviews specifically relevant to PT include: exercise for LBP, aquatic therapy for rheumatic conditions, balance training for elderly, CIMT for stroke, early mobilization in ICU, physiotherapy for CP, and many more. COCHRANE METHODS: rigorous protocol registration; comprehensive search strategy; duplicate study selection; quality assessment; transparent reporting (PRISMA checklist); meta-analysis where appropriate. PHILIPPINES: many universities provide students and clinicians free access to the Cochrane Library through institutional subscriptions or government health library access. PTs should check Cochrane Reviews when making evidence-based decisions about specific interventions.

├— ETHICS

247. 'Harm reduction' principles in PT apply when:

A. The patient engages in a dangerous sport

B. A patient engages in a HIGH-RISK BEHAVIOR (extreme sports, occupational hazards, substance use) that the PT cannot persuade them to stop — harm reduction focuses on MINIMIZING THE HARM associated with the behavior rather than eliminating it entirely; e.g.,

teaching safe lifting technique to a patient who will continue heavy manual labor despite injury risk

C. Medications are involved only

D. Only in community settings

✓ Answer: B

💡 **Rationale & Explanation:**

Harm reduction in PT: EXAMPLES: 1) A construction worker with LBP who must return to heavy manual work for financial reasons → teach optimal lifting mechanics, prescribe a back support, provide a home exercise program — reduce the RISK of injury even if the PT cannot eliminate the occupational exposure; 2) An elderly patient who refuses to stop driving despite peripheral neuropathy → assess driving safety, involve OT in driving assessment, provide exercises to maximize limb function, discuss emergency procedures — harm reduce even if full risk elimination is impossible; 3) A patient who insists on running despite a stress fracture → negotiate a safe return to PARTIAL running (on soft surfaces, reduced distance) rather than the full unrestricted running they would do without PT guidance. Harm reduction respects AUTONOMY while still providing a therapeutic benefit.

├— PROFESSIONAL PRACTICE

248. The 'ICF (International Classification of Functioning, Disability and Health)' is used in PT documentation and goal-setting because:

A. It is only for research

B. It provides a BIOPSYCHOSOCIAL FRAMEWORK that captures ALL LEVELS OF HEALTH AND DISABILITY: BODY FUNCTIONS AND STRUCTURES (impairments), ACTIVITIES (activity limitations), and PARTICIPATION (participation restrictions) — AND the CONTEXTUAL FACTORS (environmental and personal) that influence them; PT goals should address all three levels

C. It is only for physicians

D. It replaces SMART goals

✓ **Answer: B**

💡 **Rationale & Explanation:**

ICF in PT documentation: BODY FUNCTIONS AND STRUCTURES: the pathophysiology and physical impairments (reduced knee ROM, muscle weakness, neuropathic pain). ACTIVITIES: what the person can and cannot DO (walk 50m, climb stairs, dress independently). PARTICIPATION: involvement in life situations (return to work, community sports, family roles). ENVIRONMENTAL FACTORS: physical environment, social support, assistive devices, healthcare services — can be FACILITATORS or BARRIERS. PERSONAL FACTORS: age, gender, motivation, coping style, education. APPLICATION IN PT: PT assessment should address all three levels; goals should be set at each level; treatment plans address impairments to improve activity and participation; contextual factors are addressed (modify the home environment, train family members). The ICF is a language for COMMUNICATION between PT and other rehabilitation team members about the multidimensional nature of disability.

├— RESEARCH & EBP

249. In CLINICAL PREDICTION RULES (CPRs) for PT, a positive likelihood ratio (LR+) of 10 means:

A. The test is useless

B. The probability of the condition is approximately 10 TIMES MORE LIKELY if the test is positive compared to if it is negative — a LR+ >10 is considered strong (produces large changes in post-test probability); LR+ >2 = small increase; LR+ 2-5 = moderate; LR+ 5-10 = large; LR+ >10 = very large

C. The test has 10% sensitivity

D. The test correctly identifies 10 patients

✓ **Answer: B**

💡 **Rationale & Explanation:**

Likelihood ratios interpretation: LR+ (positive likelihood ratio) = sensitivity / (1 - specificity). It tells you how much the odds of having the condition INCREASE when the test is positive. INTERPRETATION: LR+ 1 = no diagnostic value; LR+ 2 = small change; LR+ 5 = moderate change; LR+ 10 = large change; LR+ >10 = very large change (almost confirms the diagnosis). BAYES THEOREM: pre-test probability + LR = post-test probability (using nomograms or Fagan's nomogram). PHILIPPINE PT BOARDS: the Wainner cervical radiculopathy cluster (LR+ 30.3 with 4/4 positive) means a 30.3-fold increase in the probability of cervical radiculopathy — essentially diagnostic. Understanding LRs helps PTs select tests that will actually change their clinical decisions and avoid tests with LR+ near 1.0 (which don't change anything).

├— PROFESSIONAL PRACTICE

250. The 'PT's ethical obligation to self-care' is important because:

A. Self-care is personal, not professional

B. A PT WHO IS PHYSICALLY OR MENTALLY UNWELL cannot provide optimal care — professional ethics requires maintaining the health and fitness needed to practice safely and competently; 'fitness to practice' is both an ethical obligation and a regulatory standard; burnout and compassion fatigue specifically impair clinical judgment and patient interaction quality

C. Self-care is only relevant for senior PTs

D. PT patients should not know if their PT has health issues

✓ **Answer: B**

💡 **Rationale & Explanation:**

PT self-care as professional obligation: FITNESS TO PRACTICE: PTs must maintain the physical health (to perform manual handling, exercise demonstration, and physical assessments safely) AND mental health

(to make good clinical judgments, communicate effectively, empathize appropriately) needed for safe practice. BURNOUT AND COMPASSION FATIGUE: recognized occupational hazards for PTs. Signs: exhaustion, cynicism, reduced empathy, increased errors, absenteeism. PREVENTION: regular physical activity; adequate sleep; work-life balance; peer support; clinical supervision; professional development; recognizing when to seek help. REGULATORY: PRC and professional codes require 'good moral character and sound physical and mental health' for licensure. A PT practicing while severely impaired is both ethically violating the duty of care AND potentially negligent. Organizations like PAPT are beginning to address PT wellness as a professional sustainability issue — critical for the long-term health of the Philippine PT workforce.

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251. The 'PT evaluation form' in the Philippines must include the PT's PRC license number because:

A. It is required by all hospitals

B. It serves as LEGAL IDENTIFICATION — confirming the document was prepared by a LICENSED professional; the PRC license number + signature is the Philippine equivalent of a professional license authentication on official documents; documents signed by unlicensed practitioners are legally invalid

C. It is optional

D. Only for billing purposes

✓ Answer: B

💡 **Rationale & Explanation:**

PRC license number on PT documents: LEGAL SIGNIFICANCE: The PRC license number on official PT documents: 1) Confirms the signatory is a LICENSED REGISTERED PHYSICAL THERAPIST; 2) Provides a traceable identifier for regulatory purposes; 3) Is required for PhilHealth billing and claims (insurance claims must be signed by a licensed provider with their PRC number); 4) Serves as authentication for medico-legal documents; 5) Is required for referral letters submitted to other healthcare providers. WHAT TO INCLUDE: full name (as it appears on

the PRC ID), professional title (RPT), PRC registration number, PTR number (current year's Professional Tax Receipt number). UNLICENSED: documents signed without a valid PRC license number are not legally recognized as PT professional documents — they cannot be used for insurance claims, medico-legal purposes, or official referrals.

ETHICS

252. The 'therapeutic privilege' exception to informed consent — when a physician or PT may WITHHOLD information from a patient:

A. Always when the patient seems anxious

B. Is VERY NARROWLY DEFINED and RARELY APPLICABLE — the argument that 'knowing this information will harm the patient' is not sufficient justification; therapeutic privilege applies ONLY in GENUINE EMERGENCIES where disclosure would cause IMMEDIATE SERIOUS HARM AND DELAY LIFE-SAVING TREATMENT; chronic conditions, anxiety, or anticipated emotional distress do NOT justify withholding information

C. Whenever the PT thinks it will help

D. Whenever family members request it

✓ Answer: B

💡 Rationale & Explanation:

Therapeutic privilege: a narrow, controversial exception to informed consent. HISTORICAL MISUSE: was widely used to justify paternalism ('the patient will be too upset to make a rational decision'). CURRENT ETHICAL STANDARD: therapeutic privilege is essentially NEVER justified for non-emergency situations because: anxiety and emotional distress are not 'harm' that justifies deception; patients have a right to information about their own condition; the therapeutic relationship is built on trust. GENUINE EXCEPTION (extremely rare): a patient in acute crisis where disclosure would prevent immediate life-saving treatment. ALWAYS: if considering therapeutic privilege → consult an ethics

committee; document the reasoning; plan to disclose as soon as the patient is stable. In PT practice: therapeutic privilege is essentially never applicable — there are virtually no PT interventions so urgent that disclosure must be withheld.

├— RESEARCH & EBP

253. 'Random allocation' in RCTs prevents:

A. Only blinding failures

B. SELECTION BIAS — if researchers can influence which patients go to which group, they may (consciously or unconsciously) place healthier, more motivated patients in the treatment group; random allocation means EACH PATIENT HAS AN EQUAL PROBABILITY of being in any group, creating GROUPS THAT ARE COMPARABLE AT BASELINE on both measured AND UNMEASURED CHARACTERISTICS

C. Publication bias

D. Confounding after the study

✓ Answer: B

💡 **Rationale & Explanation:**

Randomization and selection bias prevention: SELECTION BIAS: occurs when the groups being compared differ systematically in important characteristics at baseline — making it impossible to know if differences in outcomes are due to the treatment or the baseline differences. RANDOMIZATION ELIMINATES SELECTION BIAS: by ensuring each participant has an EQUAL PROBABILITY of assignment, randomization distributes both KNOWN confounders (age, severity, comorbidities) AND UNKNOWN confounders (genetics, motivation, social support) EVENLY between groups — the only systematic difference between groups should be the INTERVENTION. RESULT: any differences in outcomes between groups can be attributed to the INTERVENTION (not pre-existing differences). This is why RCTs are the gold standard for causal inference in clinical research.

PROFESSIONAL PRACTICE

254. 'Interprofessional education' (IPE) for PT students in the Philippines is important because:

A. PT is a solo profession

B. Rehabilitation is INHERENTLY TEAM-BASED — practicing IPE during training (e.g., joint case discussions with medical, nursing, OT, and SLP students) develops the collaborative skills, mutual respect, and communication competencies needed for effective team-based rehabilitation

C. PT students should learn in isolation

D. Only physicians need team training

✓ Answer: B

💡 Rationale & Explanation:

IPE for PT students: WHO FRAMEWORK: IPE occurs when two or more professions LEARN WITH, FROM, AND ABOUT EACH OTHER to improve collaboration and quality of care. PHILIPPINE PT CONTEXT: rehabilitation in Philippine hospitals involves physicians (physiatrists, neurologists, orthopaedists), PTs, OTs, SLPs, nurses, social workers, psychologists — effective communication and mutual understanding is essential. IPE PROGRAMS: joint case conferences (PT + OT + SLP discussing the same patient); simulation exercises where multi-professional student teams manage simulated patients; inter-professional ward rounds; home visit assessments by multi-professional student groups. BENEFITS: reduced professional stereotyping; clearer understanding of role boundaries; better communication skills; improved patient outcomes in teams that have trained together. IPE is increasingly incorporated into Philippine PT and medical school curricula.

ETHICS

255. The 'right to health' as recognized in the Philippine Constitution means:

A. PT is free for all Filipinos

B. The state is obligated to ESTABLISH, MAINTAIN, AND ENSURE ACCESS TO ADEQUATE health services — PT has an advocacy role in ensuring EQUITABLE ACCESS to rehabilitation for all Filipinos including marginalized groups (elderly, PWDs, rural poor, indigenous peoples)

C. Only hospitals are obligated

D. Private PT clinics have no obligations

✓ Answer: B

💡 **Rationale & Explanation:**

Right to health and PT: PHILIPPINE CONSTITUTION Article XIII: 'The State shall adopt an integrated and comprehensive approach to health development which shall endeavor to make essential goods, health and other social services available to all the people at affordable cost.' IMPLICATIONS FOR PT: 1) ADVOCACY: PAPT advocates for inclusion of PT in the National Health Insurance Program (PhilHealth) to expand access; 2) COMMUNITY-BASED SERVICES: PT in rural health units, barangay health centers, mobile clinics extend services beyond private hospitals; 3) CBR: community-based rehabilitation brings PT to those who cannot access clinics; 4) EQUITY: PT practitioners should reflect on whether their practice is accessible to all (language, cost, location, cultural appropriateness); 5) PROFESSIONAL ADVOCACY: the PT profession has a responsibility to advocate for policies that ensure all Filipinos can access rehabilitation services when needed.

├─ RESEARCH & EBP

256. 'Cross-over study design' in PT research is appropriate when:

A. Studying acute irreversible conditions

B. Studying conditions that are STABLE AND REVERSIBLE — each participant receives BOTH interventions sequentially (separated by a washout period); each participant serves as their own control, eliminating individual variability; requires fewer participants for the same statistical power compared to parallel group RCTs

C. Only when medication is tested

D. Only for surgical interventions

✓ **Answer: B**

💡 **Rationale & Explanation:**

Crossover study appropriateness: REQUIRES: STABLE CONDITION (patient's condition must not change significantly during the study); REVERSIBLE CONDITION (the treatment effect must wash out between periods); WASHOUT PERIOD (adequate time between interventions for the first treatment's effect to disappear). ADVANTAGES: each participant is their OWN CONTROL → eliminates between-subject variability (the major source of noise in parallel RCTs) → requires FEWER PARTICIPANTS for equal statistical power (often 50-75% fewer). DISADVANTAGES: CARRYOVER EFFECT (if the first treatment's effect persists into the second period despite washout → results confounded); longer study duration; not appropriate for: acute conditions (change naturally over time), irreversible interventions (surgery). PT EXAMPLES: comparing two TENS protocols for chronic pain; comparing two exercise approaches for stable osteoarthritis — both are stable, reversible, appropriate for crossover.

├— PROFESSIONAL PRACTICE

257. The 'PAPT advocacy' for expanded PT scope in the Philippines focuses on:

A. Reducing PT education requirements

B. DIRECT ACCESS TO PT WITHOUT PHYSICIAN REFERRAL, INTEGRATION OF PT INTO PRIMARY CARE, RURAL DEPLOYMENT PROGRAMS, AND EXPANDED PHILHEALTH COVERAGE — aligning

Philippine PT practice with international standards and evidence showing PT direct access is safe and cost-effective for musculoskeletal conditions

C. Eliminating continuing education

D. Reducing the number of PT programs

✓ Answer: B

💡 **Rationale & Explanation:**

PAPT advocacy priorities: DIRECT ACCESS: evidence from countries with direct PT access (UK, Canada, Australia, USA) shows equivalent or better outcomes vs. physician-first pathways for MSK conditions, at lower cost; fewer unnecessary imaging and specialist referrals; earlier treatment. PAPT advocates for legislative change to allow direct PT access in the Philippines (currently most settings require physician referral). PRIMARY CARE INTEGRATION: PT in community health centers and rural health units (RHUs) for early MSK, stroke, and disability management. RURAL DEPLOYMENT: incentives for PT to work in underserved rural areas (scholarship bonds, higher rural salaries, career development pathways). PHILHEALTH COVERAGE: expanding PT reimbursement beyond current case-rate packages to include more conditions and outpatient PT sessions.

├— ETHICS

258. 'Non-disclosure of errors': a PT treats a patient with the wrong ultrasound frequency (3 MHz instead of 1 MHz for a condition requiring deep heating), causing insufficient treatment effect. The PT should:

A. Not mention it

B. DISCLOSE THE ERROR TO THE PATIENT AND DOCUMENT IT — even if no immediate patient harm occurred; professional ethics requires transparency about errors; disclose: what was planned, what occurred, what the likely effect is (in this case, insufficient treatment depth, not likely to cause harm but explains why the session may have been less effective); offer to repeat the session correctly

C. Only tell the supervisor

D. Only if the patient asks

✓ **Answer: B**

💡 **Rationale & Explanation:**

PT error disclosure: PRINCIPLE OF OPEN DISCLOSURE: healthcare providers have an ethical (and in many jurisdictions, legal) obligation to disclose errors to patients — even minor errors that did not cause harm. WHY DISCLOSE MINOR ERRORS: 1) TRUST: disclosure maintains the therapeutic relationship and patient trust; 2) LEARNING: reporting and disclosing errors (even minor) helps quality improvement; 3) PROFESSIONAL INTEGRITY: veracity requires honesty about what occurred; 4) PATIENT AUTONOMY: the patient has the right to know if their treatment was not delivered as intended. DOCUMENTATION: document the error in the clinical notes, including: what was planned, what occurred, how it was recognized, what was communicated to the patient, and the corrective action. SYSTEM REPORTING: report through the institutional incident reporting system to identify patterns and prevent recurrence.

├─ RESEARCH & EBP

259. 'Repeated measures ANOVA' is used in PT research when:

A. Only two groups are compared

B. The SAME PATIENTS are measured at MULTIPLE TIME POINTS (e.g., baseline, 4 weeks, 8 weeks, 12 weeks) — this design accounts for the correlation between measurements taken on the same individuals and tests whether the outcome changes significantly over time AND whether groups differ in their trajectories

C. Three independent groups are compared

D. Only nominal data is analyzed

✓ **Answer: B**

💡 **Rationale & Explanation:**

Repeated measures ANOVA in PT: WHEN TO USE: one or more groups measured at 3+ time points; the SAME INDIVIDUALS contribute measurements at each time point; you want to test whether: 1) There is a significant change over time (WITHIN-SUBJECTS effect); 2) Groups differ from each other (BETWEEN-SUBJECTS effect); 3) Groups change differently over time (TIME × GROUP INTERACTION — the most important for PT intervention research). EXAMPLE: comparing two exercise programs (Group A and Group B) on pain NRS at baseline, 4 weeks, 8 weeks, and 12 weeks → repeated measures ANOVA can show: Does pain change over time? Do the groups differ? Is the rate of pain change different between groups? ASSUMPTIONS: normality, sphericity (tested by Mauchly's test; corrected with Greenhouse-Geisser if violated). ALTERNATIVE: mixed models for repeated measures (handles missing data better than traditional RM ANOVA).

├— PROFESSIONAL PRACTICE

260. 'CPE (Continuing Professional Education) credit' in the Philippines is calculated as:

A. 1 credit per day of attendance

B. TYPICALLY 1 CPE UNIT PER HOUR OF STRUCTURED LEARNING for PAPT-accredited activities — a 2-hour workshop = 2 units; a full-day (8-hour) seminar = 8 units; the 45-unit requirement over 3 years can be met by attending approximately 5-6 full-day conferences per 3-year period

C. 1 credit per certification

D. 10 credits per seminar always

✓ Answer: B

💡 Rationale & Explanation:

CPE credit calculation: TYPICAL PAPT-ACCREDITED ACTIVITY: 1 unit per contact hour. EXAMPLES: 1-hour lecture = 1 unit; 2-hour workshop = 2 units; 8-hour full-day seminar = 8 units; 16-hour 2-day workshop = 16 units. 45 UNITS OVER 3 YEARS: approximately: 5-6 full-day conferences

(8 units each = 40-48 units) or 1 multi-day convention (16-24 units) + several shorter workshops. OTHER CPE CATEGORIES: research presentations, publications, academic teaching — these have different unit values as defined by PRC CPD guidelines. RECORD KEEPING: PTs should maintain their CPE portfolio continuously (not scramble at renewal time); keep original certificates; organize by category and date; verify the activity was accredited BEFORE attending if units are needed for renewal (unaccredited events do not count).

ETHICS

261. 'Conscientious objection' in PT practice:

A. PTs must provide all legal services regardless of personal beliefs

B. A PT may DECLINE TO PARTICIPATE in a specific treatment procedure that conflicts with their DEEPLY HELD PERSONAL OR RELIGIOUS BELIEFS — but must REFER THE PATIENT to another provider who can provide the service; conscientious objection does not allow abandonment of the patient

C. Allows the PT to choose which patients to treat

D. Allows the PT to deny care based on diagnosis

✓ Answer: B

💡 Rationale & Explanation:

Conscientious objection in healthcare: LEGITIMATE CONSCIENTIOUS OBJECTION: declining to perform a procedure that conflicts with sincere, deeply held personal/religious beliefs. PT EXAMPLES: declining to participate in medically assisted dying if legalized; declining to perform certain reproductive health-related services. OBLIGATIONS WHEN OBJECTING: 1) DISCLOSE: inform the patient early (before care begins) of the services the PT will not provide; 2) REFER: provide a referral to another provider who can offer the service; 3) EMERGENCY CARE: even with conscientious objection, a PT may not refuse EMERGENCY treatment; 4) NO DISCRIMINATION: conscientious objection cannot be used to refuse care based on the patient's

demographics (race, gender, sexual orientation, religion) — this is discrimination, not legitimate conscientious objection. LIMITATIONS: cannot be used to deny routine PT services for non-morally-contentious reasons.

├─ RESEARCH & EBP

262. In a PT clinical trial, 'allocation concealment' is DIFFERENT from 'blinding' because:

A. They are the same thing

B. Allocation concealment PREVENTS SELECTION BIAS before randomization (the enrolling researcher does not know the next assignment); blinding PREVENTS INFORMATION BIAS after randomization (participants, therapists, or assessors do not know the group assignment during the study); both are needed but serve different purposes at different stages

C. Blinding occurs before randomization

D. Only allocation concealment affects results

✓ Answer: B

💡 Rationale & Explanation:

Allocation concealment vs. blinding: ALLOCATION CONCEALMENT (before enrollment): prevents the ENROLLING CLINICIAN from knowing which group the next patient will be in → prevents selective enrollment (putting 'better' patients in the treatment group). Occurs BEFORE the patient is enrolled. BLINDING (after enrollment): prevents participants (single blind), treatment providers (double blind), and outcome assessors (triple blind) from knowing group assignment during the study → prevents performance bias and detection bias. Occurs DURING AND AFTER the study. BOTH ARE NEEDED: a study can have adequate allocation concealment (unbreakable sequence) but poor blinding (participants quickly figure out which group they're in); or adequate blinding (convincing sham treatment) but poor allocation

concealment (transparent envelopes). For high-quality RCT appraisal: ALWAYS check both.

PROFESSIONAL PRACTICE

263. The 'scope of PT in sports' as practiced by PTs in the Philippines includes all EXCEPT:

A. Pre-participation physical examination

B. Prescribing performance-enhancing PROHIBITED SUBSTANCES — this is outside PT scope (and illegal); PT in sports manages injuries, prevents injuries, rehabilitates athletes, improves performance through legal exercise and biomechanical optimization, and supports return to sport

C. Return-to-sport rehabilitation

D. Sports performance biomechanical analysis

✓ Answer: B

💡 Rationale & Explanation:

PT in sports — scope and limitations: WITHIN PT SPORTS SCOPE: pre-participation physical examination (musculoskeletal fitness for sport); injury prevention programs (FIFA 11+, ACL prevention); acute on-field injury assessment and first aid; sports rehabilitation (post-injury, post-surgical); return-to-sport testing; performance biomechanical analysis; sports taping and bracing; athletic training and conditioning within PT scope; nutrition consultation (general — specific clinical nutrition = dietitian); psychological readiness assessment (using validated tools). OUTSIDE PT SCOPE IN SPORTS: prescribing medications (physician); prescribing performance-enhancing drugs (illegal and outside PT scope); ordering imaging (physician); diagnosing internal medical conditions (physician); performing surgery. ANTI-DOPING EDUCATION: PTs working with athletes should understand the WADA (World Anti-Doping Agency) prohibited substance list to ensure they do not accidentally recommend prohibited substances.

ETHICS

264. 'Research ethics in PT': a PT researcher who receives a grant from an ultrasound equipment manufacturer to study the effects of their ultrasound device must:

A. Not disclose the funding source

B. DISCLOSE THE FUNDING SOURCE in all publications, presentations, and grant applications — this is a conflict of interest that must be transparent; readers and institutions can then critically evaluate whether the funding source may have influenced the study design, conduct, or reporting

C. Only disclose to the IRB

D. Only disclose if asked

✓ Answer: B

💡 Rationale & Explanation:

Research conflict of interest disclosure: CONFLICT OF INTEREST (COI): any financial, personal, or professional interest that could bias the design, conduct, reporting, or interpretation of research. FINANCIAL COI EXAMPLES: funding from a device manufacturer; personal financial interest in the company (stock ownership, consulting fees); employment by the company; speaker fees from the company. MANDATORY DISCLOSURE: all journals, conference organizations, and funding bodies require COI disclosure at the time of submission/presentation. Journals publish the COI statement alongside the article. WHY: readers can evaluate whether the funding source may explain unusually positive results (industry-funded studies show positive outcomes more often than independently funded studies). PHILIPPINE PT RESEARCH: as PT research increases in the Philippines, the culture of COI disclosure must be developed and enforced — both for the integrity of Philippine PT research and for alignment with international research ethics standards.

RESEARCH & EBP

265. The 'Hawthorne effect' in PT research means:

A. A bias from randomization

B. PARTICIPANTS CHANGE THEIR BEHAVIOR BECAUSE THEY KNOW THEY ARE BEING OBSERVED or are part of a research study — this can inflate outcomes in the treatment group (and sometimes the control group) regardless of the specific intervention studied; one reason why sham/placebo-controlled trials are important

C. A statistical error

D. Only affects qualitative research

✓ Answer: B

💡 **Rationale & Explanation:**

Hawthorne effect (Elton Mayo, 1920s-30s): workers at the Hawthorne Works plant increased productivity when they were observed as part of a study — regardless of the specific change being studied. IN CLINICAL RESEARCH: participants in BOTH the treatment AND control groups may improve simply because they receive MORE ATTENTION (assessment visits, measurement, being asked about symptoms) than they normally would. IMPLICATIONS FOR PT RESEARCH: control groups that receive equal attention (assessment visits, sham treatment) but no specific intervention can still improve (partly due to Hawthorne effect); this is another reason why SHAM-CONTROLLED trials are important — both groups receive equal attention; if the treatment group still outperforms the sham group, the difference is likely specific to the treatment (not just to being observed). ACKNOWLEDGING HAWTHORNE: study designs that minimize Hawthorne effect include: patient-blinding to group assignment; using historical controls; large naturalistic studies.

PROFESSIONAL PRACTICE

266. 'Community PT' roles in the Philippine primary care context include:

A. Only treating patients in clinics

B. HEALTH PROMOTION (exercise prescription for non-communicable disease prevention, aging-in-place programs); DISABILITY PREVENTION (falls prevention, post-stroke secondary prevention); SCREENING (musculoskeletal screening for early intervention); REHABILITATION AT THE BARANGAY LEVEL (basic exercise programs for community-dwelling disabled persons); and EDUCATION (public education about rehabilitation, PT services, home exercise)

C. Only providing free services

D. Only emergency PT

✓ Answer: B

💡 **Rationale & Explanation:**

Community PT in Philippine primary care: THE PHILIPPINES has a 3-tiered healthcare system: tertiary hospitals → secondary hospitals → PRIMARY CARE (rural health units, barangay health centers). PT AT THE PRIMARY CARE LEVEL: 1) PREVENTION: exercise prescription for hypertension, diabetes, osteoporosis (non-communicable disease prevention — the primary health burden in the Philippines); 2) FALLS PREVENTION: especially for elderly community dwellers; 3) POST-HOSPITAL REHABILITATION FOLLOW-UP: patients discharged from tertiary PT services need community follow-up; 4) MUSCULOSKELETAL SCREENING: early detection of conditions that can be managed conservatively; 5) CBR COORDINATION: coordination with barangay health workers for disability management; 6) PATIENT EDUCATION: proper body mechanics, exercise, home safety. Most Philippine primary care settings are SEVERELY UNDERSTAFFED for PT — this is a major public health gap and advocacy priority.

├─ ETHICS

267. 'Genomics and PT': as genetic testing becomes more available, the PT's ethical obligations include:

A. Requesting genetic tests for patients

B. NOT INTERPRETING GENETIC RESULTS beyond the PT scope — genetic interpretation is a medical/genetic counseling function; PT may note that a patient has a diagnosed genetic condition in their history (e.g., Ehlers-Danlos syndrome, Marfan syndrome) and ADJUST REHABILITATION ACCORDINGLY, but should not request genetic tests or interpret raw genetic data

C. Only treating inherited conditions

D. Avoiding all patients with genetic conditions

✓ Answer: B

💡 **Rationale & Explanation:**

Genomics and PT scope: PT'S APPROPRIATE ROLE WITH GENETIC INFORMATION: USE existing genetic diagnoses to inform rehabilitation planning (e.g., EDS → hypermobility-focused stability training; BRCA mutation carrier → oncological PT for prevention/surveillance coordination); KNOW the rehabilitation implications of common genetic conditions (FSHD, Duchenne, EDS, Marfan); REFER to genetic counseling if a patient expresses concerns about hereditary conditions. OUTSIDE PT SCOPE: ordering genetic tests; interpreting raw genetic data; counseling on genetic risk; making medical diagnoses based on genetic information. EMERGING AREA: nutrigenomics (nutrition-gene interactions), pharmacogenomics (drug-gene interactions) — PTs providing nutritional guidance should be aware these exist but defer specific genetic dietary recommendations to dietitians and genetic counselors. As genetic testing becomes consumer-accessible (23andMe, etc.), PTs may increasingly encounter patients bringing genetic information to PT — maintaining appropriate scope boundaries is essential.

├— RESEARCH & EBP

268. 'Sampling bias' in PT research occurs when:

A. The sample is too large

B. The RESEARCH SAMPLE DOES NOT ADEQUATELY REPRESENT the TARGET POPULATION — systematic error in how participants are selected, creating a sample that is skewed toward certain characteristics and making the findings not generalizable to the full population with the condition of interest

C. The study uses randomization

D. The study has too many outcomes

✓ Answer: B

💡 **Rationale & Explanation:**

Sampling bias examples in PT research: VOLUNTEER BIAS: people who volunteer for research tend to be more health-conscious, motivated, and compliant than the average patient — treatment effects may be overestimated. EXCLUSION BIAS: studies excluding patients with comorbidities may produce results that don't apply to the typical patient (who often has multiple conditions). SURVIVOR BIAS: including only patients who are stable enough to complete the study — dropouts (often sicker patients) are excluded from analysis. CLINIC-BASED SAMPLING: recruiting from a specialized PT clinic may select patients who are more severe, or more health-seeking, than community prevalence. Philippine CONTEXT: PT research conducted in NCR tertiary hospitals may not represent patients in rural areas or with different access levels. REDUCING SAMPLING BIAS: inclusive eligibility criteria; community-based recruitment; sampling multiple sites; reporting sample characteristics fully so readers can assess generalizability.

├— PROFESSIONAL PRACTICE

269. The 'PT in occupational health' is especially important for PHILIPPINE CALL CENTER WORKERS because:

A. Call center workers are not a PT concern

B. The BUSINESS PROCESS OUTSOURCING (BPO) INDUSTRY employs millions of Filipinos in sedentary, repetitive, night-shift work that

creates HIGH RISK for: cervicogenic headaches and neck pain, upper extremity WMSDs (CTS, lateral epicondylitis, tendinopathies), LBP from prolonged sitting, sleep disorders from shift work, eye strain, and mental health challenges

C. Only medical doctors treat call center workers

D. PT is not relevant to office work

✓ Answer: B

💡 **Rationale & Explanation:**

BPO industry PT opportunities in Philippines: MAGNITUDE: the Philippine BPO industry employs 1.3+ million workers (primarily in NCR, Cebu, Davao) — one of the largest employment sectors. COMMON CONDITIONS: NECK AND SHOULDER PAIN (prolonged computer use, headsets, static posture); UPPER EXTREMITY WMSDs (CTS, lateral epicondylitis, De Quervain's tenosynovitis from keyboard/mouse use); LBP (prolonged sitting, poor workstation ergonomics); VOICE DISORDERS (call agents — not directly PT but interprofessional); SLEEP DISORDERS (night shift, irregular schedule). PT ROLES IN BPO: ergonomic workstation assessments; worksite exercise programs (desk-based exercises, break routines); return-to-work programs for WMSD; wellness programs; pre-employment physical assessment. MARKET OPPORTUNITY: PT in occupational health for the BPO sector is a growing, underserved market in the Philippines — PT entrepreneurs and clinical specialists can develop specialized services for this population.

├— ETHICS

270. The 'Philippine Medical Act' interaction with PT practice means:

A. PT and medical practice are identical

B. PTs must DIFFERENTIATE their diagnoses (PT diagnoses = movement dysfunction, activity limitations, participation restrictions) FROM MEDICAL DIAGNOSES (disease states, pathology, organic conditions) — the PT's role is to evaluate physical function and provide PT, NOT to

provide medical diagnoses, prescribe medications, or act as a substitute for medical care

C. PT can diagnose any condition

D. PT never needs to interact with physicians

✓ Answer: B

💡 **Rationale & Explanation:**

PT diagnosis vs. medical diagnosis: THE PT DIAGNOSTIC PROCESS produces: PT DIAGNOSIS (movement-related, functional): e.g., 'decreased lumbopelvic motor control with segmental hypomobility at L4-L5 contributing to activity limitations in prolonged sitting and forward bending' — this is a PT diagnosis describing MOVEMENT DYSFUNCTION. MEDICAL DIAGNOSIS (disease/pathology): e.g., 'lumbar disc herniation at L4-L5 with radiculopathy' — this is a MEDICAL DIAGNOSIS. LEGAL BOUNDARY: PTs practice under RA 10210 which defines PT scope — diagnosing disease is outside this scope; PTs who attempt to provide medical diagnoses are practicing outside their scope and potentially practicing medicine without a license. PRACTICAL COLLABORATION: the PT uses the medical diagnosis (from the physician's referral) as clinical context; develops their own PT diagnosis based on physical examination; communicates PT findings back to the physician for integrated care.

├— RESEARCH & EBP

271. The 'T-test' in PT research is used to compare:

A. Multiple groups at multiple time points

B. The MEANS OF TWO GROUPS (independent t-test: two separate groups; paired t-test: the same group at two time points) to determine if the difference between means is statistically significant; requires interval or ratio data, approximately normal distribution, and similar variances (independent t-test)

C. Three or more groups

D. Only non-normal data

✓ **Answer: B**

💡 **Rationale & Explanation:**

T-test applications: INDEPENDENT SAMPLES T-TEST: compares the mean outcome of TWO SEPARATE GROUPS (e.g., exercise group vs. control group on pain NRS at 8 weeks). ASSUMPTIONS: independent observations; outcome approximately normally distributed (or large n); similar variances (Levene's test for homogeneity). PAIRED (DEPENDENT) T-TEST: compares the mean outcome of the SAME GROUP at TWO TIME POINTS (e.g., same patients before vs. after PT — pre-test vs. post-test). MORE POWERFUL than independent t-test for same-subject designs (eliminates between-subject variability). LIMITATIONS: only two groups/time points; requires approximately normal data. ALTERNATIVE FOR NON-NORMAL DATA or ORDINAL DATA: MANN-WHITNEY U (non-parametric equivalent of independent t-test); WILCOXON SIGNED-RANK (non-parametric equivalent of paired t-test). FOR >2 GROUPS: ANOVA (or Kruskal-Wallis for non-parametric).

├─ PROFESSIONAL PRACTICE

272. 'Electronic health records' (EHR) implementation in PT clinical settings requires the PT to:

A. Use any digital record system without restrictions

B. ENSURE COMPLIANCE WITH RA 10173 (DATA PRIVACY ACT): secure access controls (passwords, two-factor authentication); encrypted data storage and transmission; audit trails (who accessed what, when); staff training on data privacy; patient informed consent for data processing; breach notification protocols

C. Store records on personal phones

D. Share access freely with all staff

✓ **Answer: B**

💡 **Rationale & Explanation:**

EHR and data privacy in PT: RA 10173 REQUIREMENTS FOR EHR: 1) ACCESS CONTROLS: role-based access (PT only sees PT-relevant data; administrative staff cannot see clinical notes unless authorized); strong passwords + account-specific logins; 2) ENCRYPTION: data encrypted during storage and transmission; cloud storage must use RA 10173-compliant platforms; 3) AUDIT TRAILS: the system must record who accessed, modified, or deleted records and when; 4) BACKUP: regular encrypted backups to prevent data loss; 5) PATIENT CONSENT: inform patients at registration that health data is processed electronically; provide a PRIVACY NOTICE; 6) INCIDENT RESPONSE: have a plan for data breaches (72-hour notification to NPC and patients). NATIONAL PRIVACY COMMISSION (NPC): Philippine government body overseeing data privacy compliance — PT clinics with EHR systems should register as PERSONAL INFORMATION CONTROLLERS with the NPC.

├─ ETHICS

273. 'Patient testimonials' and 'before and after' photos used in PT marketing:

A. Are always appropriate

B. Require EXPLICIT WRITTEN PATIENT CONSENT (including for the specific use — social media, print, web), must NOT violate patient confidentiality, must NOT use deceptive editing or claims, and must NOT use patient vulnerability for commercial exploitation — PT marketing must be HONEST, RESPECTFUL, and privacy-protecting

C. Can be used without consent

D. Are required for PT advertising

✓ Answer: B

💡 Rationale & Explanation:

PT marketing ethics: PATIENT TESTIMONIALS: require specific written informed consent (consent must describe exactly where the testimonial will be used — social media, clinic website, printed materials); patients must understand they can withdraw consent;

vulnerable patients (elderly, cognitively impaired) need extra care to ensure consent is truly voluntary. BEFORE AND AFTER PHOTOS: same consent requirements; must not be altered in misleading ways; must accurately represent typical results (not cherry-pick the best outcomes). DECEPTIVE CLAIMS: PT advertising must not claim effectiveness beyond what evidence supports; must not imply guarantees of outcomes; must not use scare tactics. DATA PRIVACY: testimonials and photos are sensitive personal information (health data) — must be handled per RA 10173. PAPT CODE: the PT Code of Ethics prohibits advertising that is misleading, deceptive, or that exploits patient vulnerability. Professional PT marketing should focus on: credentials, services offered, approach, and patient education — not on extraordinary outcome promises.

├─ RESEARCH & EBP

274. 'Effect size' in PT research: Cohen's d of 0.5 represents:

A. A trivial effect

B. A MEDIUM EFFECT SIZE — by convention: small = 0.2, medium = 0.5, large = 0.8 (Cohen, 1988); d = 0.5 means the treatment group's mean is 0.5 standard deviations better than the control group's mean — a clinically meaningful effect in most PT contexts

C. A large effect

D. A meaningless effect

✓ Answer: B

💡 **Rationale & Explanation:**

Cohen's d interpretation: d = (mean treatment - mean control) / pooled SD. COHEN'S CONVENTIONS: 0.2 = SMALL (real but small effect; may or may not be clinically important); 0.5 = MEDIUM (moderate, clinically meaningful in most contexts); 0.8 = LARGE (substantial effect; clearly clinically important in most contexts). CONTEXT MATTERS: d = 0.2 in pain research might still be clinically important (any pain reduction helps patients); d = 0.2 in disability research might not be

meaningful. CLINICAL RELEVANCE: compare effect size to the MCID in the specific outcome measure (a statistically significant finding with d=0.1 may be below the MCID and thus clinically trivial even if statistically significant). FOR PHILIPPINE PT BOARDS: recognizing small (0.2), medium (0.5), and large (0.8) effect sizes and being able to interpret their clinical significance is a key EBP competency.

├— PROFESSIONAL PRACTICE

275. The 'PRC Board Resolution' and 'Administrative Orders' affect PT practice by:

A. Having no legal force

B. CARRYING LEGAL AUTHORITY — they establish specific requirements for PT practice, CPE, clinic standards, and professional conduct; failure to comply is grounds for disciplinary action by the PBPT; PTs must STAY CURRENT with new Board Resolutions affecting their practice

C. Only applying to PT educators

D. Only applying to hospital PTs

✓ Answer: B

💡 **Rationale & Explanation:**

PRC Board Resolutions: the PRC and PBPT (Philippine Board of Physical Therapy) issue BOARD RESOLUTIONS and ADMINISTRATIVE ORDERS that carry the force of law for regulated professionals. EXAMPLES: resolutions specifying CPE requirements for renewal; administrative orders regarding PT facility standards; guidelines for specific PT procedures; requirements for PT practice in specialized settings. MONITORING CHANGES: PTs should: regularly check the PRC website for new board resolutions (prc.gov.ph); receive PAPT newsletters (which report regulatory updates); attend PAPT conventions (where regulatory updates are discussed). CONSEQUENCE OF NON-COMPLIANCE: failure to comply with Board Resolutions can constitute: violation of RA 10210; grounds for disciplinary proceedings; license

suspension or non-renewal. PROACTIVE COMPLIANCE: staying current with regulatory changes is a professional responsibility, not just a legal obligation.

ETHICS

276. 'Dual relationships' in PT occur when:

A. A PT treats patients with two different conditions

B. A PT has BOTH a PROFESSIONAL THERAPEUTIC RELATIONSHIP and ANOTHER RELATIONSHIP with the same person (employer-employee, family member, personal friend, romantic partner) — dual relationships create conflict of interest, impair professional judgment, compromise the patient's ability to be honest, and potentially exploit power differentials

C. A PT works in two hospitals simultaneously

D. A PT treats both PT and OT patients

✓ Answer: B

💡 Rationale & Explanation:

Dual relationships in PT: TYPES: FAMILY/FRIEND: treating a family member or close friend (both parties find it difficult to maintain appropriate professional role separation; the patient may not be honest about symptoms); EMPLOYER-EMPLOYEE: treating your employer (creates power imbalance — can the patient freely decline or modify treatment?); ROMANTIC: romantic involvement with a current or recent patient is ALWAYS UNETHICAL in any health profession (the power differential makes true consent impossible; exploitation of the therapeutic trust). MANAGING DUAL RELATIONSHIPS: BEST: avoid treating people with whom you have or are likely to develop significant dual relationships — refer them to a colleague. WHEN UNAVOIDABLE (e.g., PT in a remote area treating family in an emergency): acknowledge the complexity; document extensively; seek supervision; transition to another provider as soon as

feasible. The key concern: dual relationships DISTORT CLINICAL JUDGMENT and COMPROMISE PATIENT SAFETY.

RESEARCH & EBP

277. 'Grounded theory' in qualitative PT research generates:

A. Statistical relationships

B. THEORY ABOUT A SOCIAL PROCESS grounded in empirical data — the theory 'emerges' from systematic analysis of qualitative data (usually interviews); particularly useful for understanding how people NAVIGATE COMPLEX PROCESSES (e.g., 'How do stroke survivors navigate the journey from hospital to community reintegration?')

C. Case descriptions

D. Diagnostic criteria

✓ Answer: B

💡 **Rationale & Explanation:**

Grounded theory in PT: ORIGIN: Glaser and Strauss (1967) developed grounded theory for generating new theories about social processes from qualitative data (rather than testing existing theories). PROCESS: 1) Purposive sampling (select participants who have experienced the process of interest); 2) Constant comparative analysis (compare each new piece of data to existing categories); 3) Theoretical saturation (stop collecting data when no new categories emerge); 4) Theoretical memo writing; 5) Theory generation. PT EXAMPLES: 'A grounded theory of how PTs incorporate patient preferences into clinical decision-making'; 'A grounded theory of chronification of LBP from the patient perspective.' OUTPUT: a theoretical model explaining a PROCESS (e.g., the stages patients go through from acute injury to chronic pain acceptance). DISTINCTION FROM PHENOMENOLOGY: grounded theory focuses on SOCIAL PROCESSES; phenomenology focuses on the ESSENCE OF EXPERIENCE. Both are legitimate qualitative research methods in PT.

PROFESSIONAL PRACTICE

278. The 'PT in aging-in-place' programs for Filipino elderly:

A. Only treats falls

B. Provides COMPREHENSIVE SERVICES enabling elderly Filipinos to remain in their homes and community as long as safely possible: fall prevention (exercise, home modification assessment), cognitive health support (evidence-based exercise for dementia prevention), chronic disease management (exercise for diabetes, hypertension, arthritis), functional independence maintenance, caregiver training, and COORDINATION WITH BARANGAY HEALTH SERVICES

C. Only provides assistive devices

D. Only treats post-surgical patients

✓ Answer: B

💡 **Rationale & Explanation:**

Aging-in-place PT for Filipino elderly: PHILIPPINE DEMOGRAPHIC CONTEXT: rapidly aging population (projected 15 million elderly by 2030); most elderly prefer to remain in their homes/communities (strong Filipino family and community values); inadequate nursing home infrastructure; preference for family-based care. PT CONTRIBUTIONS TO AGING-IN-PLACE: 1) FALL PREVENTION (most critical): progressive balance and strength training + home safety assessment + footwear advice; 2) FUNCTIONAL MAINTENANCE: exercise programs to preserve ADL capacity; 3) CHRONIC DISEASE MANAGEMENT: evidence-based exercise for diabetes, hypertension, COPD, OA; 4) COGNITIVE HEALTH: aerobic and resistance exercise shown to reduce dementia risk; 5) CAREGIVER TRAINING: teaching family members safe handling, transfers, exercise assistance; 6) COORDINATION WITH BARANGAY HEALTH WORKERS: cascading simple exercise programs through barangay health workers. DELIVERY: home visits, community centers, barangay health centers, telehealth for follow-up.

RESEARCH & EBP

279. 'Phenomenological research' in PT explores:

A. Statistical averages of outcomes

B. The LIVED EXPERIENCE of a condition or situation — how it FEELS FROM THE INSIDE, the subjective meaning-making, and the essential structure of the experience; particularly valuable for understanding patient perspectives that cannot be captured by outcome measures

C. Biomechanical measurements

D. Only chronic conditions

✓ Answer: B

💡 Rationale & Explanation:

Phenomenological research in PT: ORIGIN: Edmund Husserl's philosophy (early 20th century); Merleau-Ponty's phenomenology of the body is particularly relevant to PT. GOAL: understand the ESSENCE OF AN EXPERIENCE from the perspective of those who have lived it. METHODS: in-depth interviews (open-ended questions); reflective journaling; the researcher 'brackets' their own preconceptions. PT EXAMPLES: 'What is the lived experience of returning to work after a spinal cord injury?'; 'How do elderly patients experience chronic pain?'; 'What is it like for a PT to deliver a terminal prognosis to a patient?'. WHY PHENOMENOLOGY IN PT: PT outcome measures capture WHAT PATIENTS CAN DO (functional); phenomenology captures HOW IT FEELS to be in that condition — the meaning, the suffering, the adaptation. This information is essential for patient-centered care and humanistic PT practice. RELEVANCE TO PHILIPPINE PT EDUCATION: phenomenological research develops empathy, patient-centeredness, and deeper clinical understanding beyond what quantitative studies provide.

PROFESSIONAL PRACTICE

280. 'PT for prison/detention populations' in the Philippines raises which unique ethical considerations?

A. No unique ethical issues

B. INFORMED CONSENT IS POTENTIALLY COMPROMISED (incarcerated individuals may feel coerced — 'if I don't participate, it will affect my case'); CONFIDENTIALITY IS LIMITED (authorities may have access to health records); POWER DYNAMICS affect the therapeutic relationship; the PT must actively protect PATIENT AUTONOMY and ensure consent is as voluntary as possible in a constrained environment

C. PTs cannot treat incarcerated persons

D. Only government PTs can treat prisoners

✓ Answer: B

💡 **Rationale & Explanation:**

PT in correctional settings: UNIQUE ETHICAL CHALLENGES: 1) VOLUNTARY CONSENT: prisoners are under institutional authority → may feel pressured to consent to PT; the PT must communicate clearly that PT participation is VOLUNTARY and has no effect on legal status or prison conditions; 2) CONFIDENTIALITY: health records in prisons may be accessible to authorities — explain limitations; minimize documentation of non-health information; 3) DUAL OBLIGATIONS: the PT may be both serving the patient's health and the institution's interests (rehabilitation for reintegration); when these conflict, patient welfare takes priority; 4) PROFESSIONAL INDEPENDENCE: the PT must resist pressure to provide reports that compromise patient confidentiality; 5) RESOURCE CONSTRAINTS: prison PT is often under-resourced — the PT must advocate for adequate care while working within real constraints. Despite these challenges, incarcerated individuals have the SAME RIGHT TO HEALTHCARE as any other person.

├— RESEARCH & EBP

281. 'Construct validity' of a PT outcome measure means:

A. It gives the same result twice

B. The measure ACTUALLY MEASURES THE THEORETICAL CONSTRUCT IT CLAIMS TO MEASURE — e.g., a balance test claiming to measure 'postural stability' actually correlates with other recognized measures of postural stability and predicts fall risk (which is the theoretical consequence of poor postural stability)

C. It is easy to administer

D. Only that it has high sensitivity

✓ Answer: B

💡 **Rationale & Explanation:**

Construct validity: the MOST FUNDAMENTAL type of validity — does the measure actually measure the construct it claims to? EVIDENCE FOR CONSTRUCT VALIDITY: 1) CONVERGENT VALIDITY: the new measure correlates strongly with other established measures of the SAME construct (e.g., a new balance test correlates with the BBS); 2) DISCRIMINANT VALIDITY: the new measure does NOT correlate strongly with measures of DIFFERENT constructs (e.g., a balance test should not correlate highly with a pain scale); 3) KNOWN GROUPS VALIDITY: the measure distinguishes between groups known to differ on the construct (e.g., a postural stability test scores lower in elderly fallers than non-fallers). CLINICAL IMPLICATION: when selecting an outcome measure, verify it has construct validity evidence in YOUR patient population — a measure validated in healthy young adults may not have construct validity in elderly stroke patients.

├— PROFESSIONAL PRACTICE

282. In the Philippines, the 'barangay health worker' (BHW) can assist PT-supervised rehabilitation because:

A. BHWs are licensed PTs

B. BHWs can be TRAINED BY PTs to deliver SUPERVISED BASIC REHABILITATION ACTIVITIES in the community — under PT supervision (task-shifting), BHWs can assist with: home exercise coaching, basic mobility assistance, fall prevention activity facilitation, and linking patients to PT services; this extends the reach of PT in resource-limited settings

C. BHWs replace PTs in rural areas

D. BHWs are not part of the healthcare system

✓ **Answer: B**

💡 **Rationale & Explanation:**

Task-shifting to BHWs with PT supervision: BHWs (barangay health workers) are community health volunteers or paid workers who provide basic health services at the barangay level. PT-SUPERVISED TASK-SHIFTING: the PT provides initial assessment and prescribes the exercise/rehabilitation program; the PT TRAINS the BHW to coach and assist the patient with the specific prescribed activities; the BHW provides ongoing home coaching under PT oversight; the PT conducts periodic reassessments. SCOPE LIMITS: the BHW does NOT diagnose, does NOT modify the PT prescription independently, does NOT perform manual therapy or modalities. BENEFITS: extends PT reach to rural, homebound, and underserved populations; cost-effective use of limited PT resources; maintains patient-community connection. EVIDENCE: WHO supports task-shifting in rehabilitation as an effective strategy for LMICs; the CBR matrix includes this approach.

├— ETHICS

283. 'Research with vulnerable populations' (children, cognitive impairment, prisoners, pregnant women): additional protections required include:

A. Standard consent is sufficient

B. ADDITIONAL SAFEGUARDS: for children — ASSENT (child's agreement, age-appropriate) in addition to PARENTAL/GUARDIAN

CONSENT; for cognitive impairment — surrogate consent (legal guardian or proxy) plus participant ASSENT if the person has some understanding; for pregnant women — ensure the fetus is not exposed to risk without justified benefit; for ALL — enhanced CONFIDENTIALITY, RIGHT TO WITHDRAW without consequence, independent advocacy support

C. Only verbal consent

D. No additional protections needed

✓ **Answer: B**

💡 **Rationale & Explanation:**

Vulnerable population research ethics: CHILDREN (under 18): PARENTAL CONSENT required; CHILD ASSENT (child's agreement in age-appropriate language) should also be obtained for children >7 years; a child's refusal should be respected even with parental consent. COGNITIVE IMPAIRMENT: legal guardian or healthcare proxy provides consent; the person with impairment should also ASSENT to the extent of their capacity; minimize research burden; ensure any potential for harm is minimal. PREGNANT WOMEN: special protection for the fetus; pregnant women should not be excluded from ALL research (exclusion denies them evidence-based care) but research involving pregnant women requires additional IRB scrutiny and fetal risk assessment. PRISONERS: institutional authority may compromise voluntariness — additional oversight, independent advocate. PHILIPPINE REGULATORY: the NEGHHR (National Ethics Guidelines for Health-Related Research) provides Philippine-specific guidance on vulnerable population research.

├— PROFESSIONAL PRACTICE

284. The 'IPR meeting documentation' (Interprofessional Rehabilitation team meeting notes): the PT's contribution to IPR documentation should include:

A. Medical history only

B. PT ASSESSMENT FINDINGS (functional status, ROM, balance, gait, UE function — standardized outcome measure scores), PT GOALS (SMART, agreed with patient), PROGRESS TOWARD GOALS (objective comparison to last meeting), TREATMENT PLAN UPDATES (changes to PT frequency, intensity, or approach), and DISCHARGE PLANNING CONTRIBUTION (PT-relevant criteria for discharge home or transfer to next level of care)

C. Only the diagnosis

D. Only medication changes

✓ Answer: B

💡 **Rationale & Explanation:**

PT contributions to IPR documentation: GOOD IPR MEETING NOTE FOR PT: 1) CURRENT FUNCTIONAL STATUS: FIM motor score; BBS/TUG results; gait speed (10MWT); UE FMA or ARAT; ADL independence; 2) CHANGE FROM LAST MEETING: 'BBS improved from 42 to 47/56 (above MCID of 4 points) — improved dynamic balance'; 3) PT GOALS: 'STG: achieve independent sit-to-stand within 2 weeks; LTG: walk 50m with a quad cane independently within 4 weeks'; 4) TREATMENT PLAN: 'Current PT: 5×/week 45-minute sessions; ROM, gait training, balance training, progressive strengthening'; 5) DISCHARGE CRITERIA: 'PT discharge home when: ambulates 50m independently with cane, manages stairs (6 steps), family/carer trained in home exercise program'; 6) FLAGS: 'Posterior tibial tendon pain developed this week — modified foot loading exercises; referred to podiatry for orthotic assessment.'

├— RESEARCH & EBP

285. 'Pragmatic clinical trials' in PT differ from 'explanatory trials' because:

A. Pragmatic trials use smaller samples

B. Pragmatic trials test interventions in REAL-WORLD CONDITIONS (diverse patients, routine care settings, typical therapists) to answer

'DOES THE TREATMENT WORK IN PRACTICE?'; explanatory trials test under IDEAL CONDITIONS to answer 'CAN THE TREATMENT WORK?' (efficacy); pragmatic trials have higher external validity; explanatory trials have higher internal validity

C. Pragmatic trials don't use randomization

D. Explanatory trials are more practical

✓ **Answer: B**

💡 **Rationale & Explanation:**

Pragmatic vs. explanatory trials: EXPLANATORY (EFFICACY) TRIALS: highly controlled conditions; highly selected patients (narrow eligibility criteria); highly trained therapists following strict protocols; monitors adherence closely; maximizes INTERNAL VALIDITY (the best-case scenario for the intervention). PRAGMATIC (EFFECTIVENESS) TRIALS: routine clinical care; broad eligibility (resembles real patients); typical clinical therapists; normal clinical practice delivery; patient-centered outcomes; maximizes EXTERNAL VALIDITY (will it work in the real world?). PCORI: Patient-Centered Outcomes Research Institute funds pragmatic trials because they answer the CLINICAL QUESTION ('should I use this treatment with my patient?') more directly than explanatory trials. Philippine PT research increasingly needs PRAGMATIC TRIALS: testing whether interventions proven in Australian or UK hospitals also work in Philippine secondary hospitals with fewer resources and different patient populations.

├— PROFESSIONAL PRACTICE

286. The 'CPE exemptions' from PRC CPE requirements apply to:

A. No professionals

B. THOSE SERVING IN REMOTE AREAS with no CPE access, or THOSE WHO ARE VERY RECENTLY GRADUATED (within the first compliance period) — and other specific circumstances defined by PRC Board Resolutions; PTs in overseas employment may have different

requirements; consult the current PRC guidelines for any exemption claims

C. All PTs over age 60

D. All government PTs

✓ Answer: B

💡 **Rationale & Explanation:**

CPE exemptions (current PRC guidelines): RECENT GRADUATES: PTs who graduate WITHIN the current 3-year CPE cycle may have reduced requirements for the first incomplete cycle. OVERSEAS EMPLOYMENT: PTs practicing abroad may submit evidence of CPE activities completed in their country of employment — subject to PRC evaluation. DISABILITY or ILLNESS: may qualify for a deferral or reduced requirement with documentation. REMOTE AREA PRACTITIONERS: may qualify for exemptions or alternative CPE delivery (online CPE). HOW TO APPLY: submit a written request to the PBPT with supporting documentation; the Board reviews and decides on a case-by-case basis. CURRENT RULES MAY CHANGE: always check the CURRENT PRC Board Resolution on CPD/CPE requirements — rules may be updated between editions of this reviewer. The information provided represents general principles; verify specific exemption criteria directly with the PRC or PAPT.

├─ ETHICS

287. 'Boundaries of competence' principle: the PT receives a referral for a condition they have never treated (complex pelvic floor dysfunction post-pelvic cancer). Ethically:

A. Treat without any preparation

B. SEEK SUPERVISION, ADDITIONAL TRAINING, OR REFER — accepting the case WITHOUT adequate competence violates the principle of beneficence (the patient deserves a PT who is competent in this area) and non-maleficence (an incompetent therapist may harm the patient); options: 1) Refer to a pelvic floor PT specialist; 2) Accept the

case with DIRECT SUPERVISION from a pelvic floor specialist; 3) Obtain rapid professional development and then accept with appropriate follow-up

C. Treat and hope for the best

D. Only document that you lack experience

✓ Answer: B

💡 **Rationale & Explanation:**

Boundaries of competence: CORE PRINCIPLE: practice only within the BOUNDARIES OF YOUR COMPETENCE (skills, knowledge, experience). ASSESSMENT: honestly evaluate whether you have: adequate knowledge of the condition; technical skills for the required assessment and interventions; familiarity with relevant evidence-based protocols; experience with similar patients. OPTIONS WHEN APPROACHING LIMITS: 1) REFER (cleanest solution — protects the patient and the PT); 2) SUPERVISE: find a mentor who is competent in this area; treat the patient under supervision; gradually develop your competence with experienced oversight; 3) DECLINE AND EXPLAIN: tell the referring physician and patient that you don't have the specific expertise and provide appropriate referral resources. NOT AN OPTION: treating without preparation, inadequate assessment, and guessing. The legal standard: a PT must practice at the level of a reasonably competent PT with APPROPRIATE training for the clinical situation.

├— RESEARCH & EBP

288. In a PT meta-analysis showing I^2 = 85%, the correct interpretation is:

A. All studies show the same effect

B. HIGH HETEROGENEITY — 85% of the variability in study results is due to TRUE DIFFERENCES between studies (different patient populations, different interventions, different outcomes, different contexts) rather than chance; this level of heterogeneity questions whether it is meaningful to pool the results into a single estimate; a subgroup analysis or qualitative synthesis may be more appropriate

C. No evidence of bias

D. The sample size is adequate

✓ **Answer: B**

💡 **Rationale & Explanation:**

I^2 interpretation: I^2 measures the PROPORTION of variance in effect estimates across studies due to TRUE HETEROGENEITY (not sampling error). INTERPRETATION: 0-25% = LOW heterogeneity (studies are reasonably consistent — pooling is appropriate). 25-75% = MODERATE (some inconsistency — pooling may be appropriate with caution). 75-100% = HIGH (substantial inconsistency between studies — the studies are measuring different things in different contexts; pooling them may produce a misleading average that doesn't represent any real clinical situation). WITH I^2 = 85%: the meta-analysis pooled estimate should be interpreted VERY CAUTIOUSLY; subgroup analyses (by severity, by treatment dose, by population) to explain the heterogeneity are needed; the narrative synthesis of each study individually may be more informative than the pooled estimate. Philippine PT: when reading PT meta-analyses, ALWAYS check I^2 — a meta-analysis with high I^2 provides weaker guidance than one with low I^2.

├— PROFESSIONAL PRACTICE

289. 'Telehealth ethics' for PT: which scenario represents an ETHICAL CONCERN specific to telehealth?

A. A patient lives far from the PT clinic

B. A PT provides telehealth PT to a patient in a PROVINCE OUTSIDE THEIR PRC LICENSURE JURISDICTION — currently, Philippine PT licensure is national (PRC issues a single national license), so this is less of a concern than in countries with state licensure; however, cross-border telehealth to OVERSEAS patients (abroad) raises jurisdictional questions that must be resolved before treatment

C. A patient uses a smartphone

D. A patient prefers video to in-person

✓ **Answer: B**

💡 **Rationale & Explanation:**

Telehealth jurisdiction ethics: WITHIN THE PHILIPPINES: Philippine PT licensure is NATIONAL (one PRC license covers practice anywhere in the Philippines, unlike the USA where each state has separate licensure). Telehealth PT from Manila to Mindanao = same national jurisdiction → generally acceptable under current Philippine licensing. INTERNATIONAL TELEHEALTH: providing PT services to a Filipino patient in a foreign country via telehealth raises questions: Is the PT licensed in that foreign country (or in that state/province)? Does the Philippine PT license cover practice in another country? The patient's jurisdiction's laws may govern the PT-patient relationship when the patient is abroad. EMERGING GUIDANCE: PAPT and PRC have not yet issued definitive guidelines on cross-border telehealth (as of 2025) — PTs considering international telehealth should: check the destination country's regulations; consult PAPT/PRC; document the jurisdictional considerations; exercise caution.

├— RESEARCH & EBP

290. 'Intraclass Correlation Coefficient' (ICC) for PT outcome measure reliability: ICC of 0.90 represents:

A. Poor reliability

B. EXCELLENT RELIABILITY — ICC ≥0.90 = excellent; ICC 0.75-0.90 = good; ICC 0.50-0.75 = moderate; ICC <0.50 = poor (Koo and Li, 2016 criteria); ICC 0.90 means 90% of the observed variance in scores is due to TRUE DIFFERENCES between patients, and only 10% is due to measurement error or rater variability

C. Moderate reliability

D. Just acceptable reliability

✓ **Answer: B**

💡 **Rationale & Explanation:**

ICC for clinical reliability: ICC = the ratio of VARIANCE DUE TO TRUE DIFFERENCES BETWEEN PATIENTS / TOTAL VARIANCE (= true variance + measurement error variance). ICC 0.90: 90% of variance is due to real patient differences; only 10% due to error. TYPES OF ICC: ICC (2,1) or ICC (3,1) — test-retest (same rater, two occasions) for intra-rater reliability; ICC (2,1) — inter-rater (two different raters, same occasion) for inter-rater reliability. CLINICAL THRESHOLDS (Koo & Li 2016): <0.50 = POOR; 0.50-0.75 = MODERATE; 0.75-0.90 = GOOD; >0.90 = EXCELLENT. INTERPRETING RELIABILITY FOR CLINICAL USE: excellent ICC (>0.90) = clinician can confidently use this tool to track individual patient changes over time; moderate ICC (0.50-0.75) = the tool may be useful for group comparisons in research but has too much measurement error for confident individual patient tracking.

PROFESSIONAL PRACTICE

291. 'Ethics in PT administration': a PT department head who over-bills PhilHealth for PT services not rendered is committing:

A. A minor administrative error

B. HEALTHCARE FRAUD — a criminal and professional offense; this violates the Anti-Graft and Corrupt Practices Act, PhilHealth regulations, and the PT Code of Ethics; consequences include: criminal prosecution, PhilHealth exclusion, PRC disciplinary action including license revocation, and institutional penalties

C. An acceptable practice under resource constraints

D. Only a billing error

✓ **Answer: B**

💡 **Rationale & Explanation:**

PT healthcare fraud: TYPES OF PT FRAUD: billing for services not rendered; upcoding (billing for a more complex service than was provided); duplicate billing (billing multiple payers for the same

service); unbundling (billing each component of a service separately when it should be billed as a package); billing for services performed by unlicensed staff. CONSEQUENCES: CRIMINAL: Anti-Graft and Corrupt Practices Act (RA 3019) — criminal prosecution; imprisonment; fines; PHILHEALTH: exclusion from accreditation; recovery of fraudulent payments; PROFESSIONAL: PRC license revocation; publication of the disciplinary action. WHISTLEBLOWING: employees who discover healthcare fraud have an obligation to report it; some protection is available. PREVENTION: proper documentation; regular audit of billing vs. actual services; staff training on billing ethics; internal controls. Healthcare fraud is a SERIOUS CRIME that diverts public health funds from legitimate patient care — it is incompatible with PT's ethical obligation to serve the public.

├─ RESEARCH & EBP

292. 'Translational research' in PT (T1-T4 translation) means:

A. Translating research papers from English

B. Moving research findings from BASIC SCIENCE (T1: discovery) through CLINICAL TRIALS (T2: testing in people) to CLINICAL PRACTICE GUIDELINES (T3: implementation) to POPULATION HEALTH IMPACT (T4: real-world outcomes) — the major bottleneck in PT is T2→T3 translation (proven treatments are not being used in clinical practice)

C. Only animal research

D. Only qualitative research

✓ Answer: B

💡 **Rationale & Explanation:**

Translational research pipeline in PT: T0: BASIC SCIENCE (molecular, cellular, biomechanical discoveries — 'bench research'). T1: FIRST IN HUMAN (early clinical trials, safety studies — 'bench to bedside'). T2: CLINICAL TRIALS (efficacy and effectiveness RCTs). T3: GUIDELINE DEVELOPMENT and IMPLEMENTATION (clinical practice guidelines, knowledge translation — 'bedside to practice'). T4: POPULATION

HEALTH IMPACT (large-scale community benefit — 'practice to population'). THE MAJOR BOTTLENECK IN PT: the T2→T3 gap — there is substantial evidence from RCTs that many PT interventions work, but clinical uptake in practice is slow. KNOWLEDGE TRANSLATION strategies: educational outreach, clinical practice guidelines, clinical decision support, opinion leaders, academic detailing. Philippine PT: the T2→T3 gap is even larger in the Philippines because: limited access to international journals; limited CPE that translates evidence into practice skills; limited clinical guidelines adapted for Filipino populations and resources.

├— PROFESSIONAL PRACTICE

293. 'PT professional associations' at the international level include:

A. PAPT only

B. WORLD PHYSIOTHERAPY (formerly WCPT — World Confederation for Physical Therapy) — the global professional organization representing PTs worldwide; PAPT is the Philippine MEMBER ORGANIZATION of World Physiotherapy; World Physiotherapy sets global standards for PT education, practice, and research

C. WHO only

D. IOC (International Olympic Committee)

✓ Answer: B

💡 **Rationale & Explanation:**

World Physiotherapy (formerly WCPT): founded 1951; headquartered in London; represents ~120 national member organizations worldwide (PAPT represents the Philippines). KEY FUNCTIONS: sets GLOBAL STANDARDS for PT entry-level education; establishes GLOBAL POLICY STATEMENTS on PT practice areas; supports development of PT in low-middle income countries; organizes the World Physiotherapy Congress (bi-annual); advocates for PT at the global health level (WHO consultative status). WORLD PHYSIOTHERAPY RESOURCES: extensive library of policy statements, clinical guidelines, and education

resources freely available online. PHILIPPINE PT CONNECTION: PAPT MEMBERSHIP in World Physiotherapy: 1) Entitles PAPT members to World Physiotherapy member benefits; 2) Gives Philippine PT a voice in global PT policy; 3) Access to global PT research networks; 4) International recognition of the Philippine PT degree (world physiotherapy education standards). Filipino PTs should be aware of World Physiotherapy as the source of many global PT standards.

ETHICS

294. The 'equal treatment' principle in PT means:

A. Treating all patients identically

B. Providing EQUITABLE CARE that addresses each patient's SPECIFIC NEEDS, circumstances, and goals — not treating all patients with the same protocol, but ensuring all receive care of EQUIVALENT QUALITY and RESPECT regardless of their diagnosis, demographics (age, gender, race, religion, socioeconomic status, sexual orientation, political beliefs), or ability to pay

C. Only treating patients who can pay

D. Prioritizing patients based on payment

✓ Answer: B

💡 Rationale & Explanation:

Equal treatment and equity in PT: EQUALITY vs. EQUITY: EQUALITY = giving everyone the same thing; EQUITY = giving everyone what they need to achieve the same outcome. PT must practice EQUITY: a patient with a language barrier needs additional communication support (equity) not fewer explanations (equality); a patient with low health literacy needs simpler explanations (equity); a patient with physical disability needs adapted exercises (equity). PROTECTED CHARACTERISTICS: under Philippine law and the PT Code of Ethics, care cannot be denied or diminished based on: race, religion, gender, sexual orientation, age, disability, language, socioeconomic status, political beliefs. EQUAL QUALITY: a patient in a public hospital deserves

the same quality of PT assessment, clinical reasoning, and treatment selection as a patient in a private hospital — resource constraints may limit equipment but should not compromise professional standards.

├─ RESEARCH & EBP

295. 'Patient-reported outcomes' (PROs) are increasingly important in PT research because:

A. They are easier to administer

B. They CAPTURE WHAT MATTERS MOST TO PATIENTS — their experience of symptoms, functioning, and quality of life — which may differ from what clinicians measure (ROM, strength, balance tests); PROs shift the research focus from surrogate endpoints to OUTCOMES THAT MATTER TO PATIENTS and their daily lives

C. They replace clinical measurements

D. They are more accurate than clinical tests

✓ Answer: B

💡 **Rationale & Explanation:**

Patient-reported outcomes (PROs) in PT: RATIONALE: traditional PT outcome measures (ROM, MMT, gait speed) measure IMPAIRMENTS and PERFORMANCE — important for clinical decisions but may not capture what matters most to the patient (Can they return to gardening? Do they feel safe walking to the shops?). PROs: standardized questionnaires completed BY THE PATIENT reporting: symptoms (pain, fatigue, dyspnea); function (KOOS, DASH, ODI, PRWE); quality of life (SF-36, EQ-5D); activity and participation (PROMIS). ADVANTAGES: capture the patient's OWN PERSPECTIVE (not a clinician's proxy); sensitive to changes the patient notices in daily life; relevant to the ICF activity and participation levels; increasingly required by regulatory bodies (FDA PRO guidance) and health technology assessors for PT intervention approval. PHILIPPINE PT: validated Filipino-language PROs are needed — many international

PROs have been translated and culturally validated for Filipino use; others require translation and validation.

├— PROFESSIONAL PRACTICE

296. The PT's 'duty to maintain confidentiality' has well-recognized EXCEPTIONS including:

A. Only when family requests

B. MANDATORY REPORTING (child or elder abuse/neglect — legally required in some jurisdictions); PUBLIC HEALTH REPORTING (notifiable diseases); LEGAL ORDERS (court subpoena requiring records); IMMINENT DANGER (Tarasoff duty to warn about specific threats to identifiable persons); and WITH PATIENT CONSENT (the patient authorizes disclosure)

C. Whenever the PT decides it is helpful

D. Only for criminal cases

✓ Answer: B

💡 **Rationale & Explanation:**

Exceptions to confidentiality: MANDATORY REPORTING: in the Philippines, certain conditions requiring mandatory reporting may include: infectious diseases (under DOH notifiable disease surveillance); child abuse (RA 7610 requires reporting of suspected child abuse); elder abuse (less clearly mandated but emerging). LEGAL ORDERS: a Philippine court can issue a subpoena duces tecum compelling production of medical records for legal proceedings — the PT must comply but should: inform the patient; provide only the records specifically subpoenaed; seek legal advice if uncertain. IMMINENT DANGER (Tarasoff): specific, credible threat to an identifiable person — duty to warn. TREATMENT TEAM: sharing information with the healthcare team directly involved in the patient's care is NOT a breach of confidentiality (this is the purpose of the healthcare team). CONSENT: patients can authorize disclosure to family, employers, insurance companies, etc. — get this in WRITING.

ETHICS

297. 'Fiduciary relationship' in PT means:

A. The PT should maximize their income

B. The PT-patient relationship is a TRUST-BASED relationship where the PT holds a POSITION OF POWER AND TRUST that must be used EXCLUSIVELY FOR THE PATIENT'S BENEFIT — the fiduciary is legally and ethically obligated to act in the interests of the person who trusts them, not in their own interests

C. The PT is a financial advisor

D. The PT should be neutral

✓ Answer: B

💡 **Rationale & Explanation:**

Fiduciary relationship in PT: FIDUCIARY: a person entrusted with power or property to manage on behalf of another person; the fiduciary must act in the BENEFICIARY'S best interests. PT-PATIENT RELATIONSHIP IS FIDUCIARY: the patient TRUSTS the PT with: their body (during physical examination and treatment); sensitive personal information (medical history, symptoms, personal life context); their health — the most important thing they have. The PT has POWER over the patient (expert knowledge, physical access, emotional vulnerability during pain/disability). OBLIGATIONS ARISING FROM FIDUCIARY STATUS: 1) PRIMACY OF PATIENT INTERESTS: the patient's welfare comes before the PT's financial or personal interests; 2) LOYALTY: undivided professional commitment to the patient's welfare; 3) TRANSPARENCY: disclose conflicts of interest; 4) CONFIDENTIALITY: protect information entrusted to the PT. VIOLATIONS: referring patients to your own clinic for financial gain; performing unnecessary treatments for billing; maintaining patients in treatment longer than needed for revenue.

RESEARCH & EBP

298. 'Explanatory factor analysis' in PT outcome measure development is used to:

A. Test diagnostic accuracy

B. IDENTIFY THE UNDERLYING DIMENSIONS (factors) of a scale — grouping items that correlate highly with each other (measuring the same underlying construct) and separately from items that measure different constructs; essential for ESTABLISHING THE STRUCTURE and VALIDITY of new PT outcome measures

C. Measure responsiveness

D. Calculate ICC

✓ Answer: B

💡 **Rationale & Explanation:**

Explanatory factor analysis (EFA) in PT scale development: NEW OUTCOME MEASURE DEVELOPMENT PROCESS: 1) Generate items (from literature, expert opinion, patient interviews); 2) Pilot with patients; 3) EFA: analyze the correlation structure to identify how many factors (subscales) underlie the item pool; items that load high on the same factor measure the same construct → grouped into one subscale; 4) Confirm with CONFIRMATORY FACTOR ANALYSIS (CFA) in a new sample; 5) Calculate reliability (ICC, Cronbach's alpha); 6) Establish validity (construct, concurrent, predictive). FACTOR LOADING THRESHOLD: ≥0.40 is typically acceptable for an item to be retained in a factor. EXAMPLE: developing a new Filipino PT patient satisfaction scale — EFA might reveal 3 factors: communication quality, technical competence, physical environment — suggesting a 3-subscale instrument structure. Understanding EFA helps PT researchers and advanced practitioners critically appraise new outcome measures being proposed for clinical use.

├— PROFESSIONAL PRACTICE

299. The 'national disability prevalence' in the Philippines is approximately:

A. 1%

B. 1.57% of the population (approximately 1.57 million persons based on the 2010 PSA census with persons with disability) — the ACTUAL prevalence is likely higher due to underreporting and definitional issues; CHRONIC CONDITIONS that create functional disability (stroke, arthritis, COPD) are not always categorized as 'disability' in census data

C. 10%

D. 25%

✓ Answer: B

💡 **Rationale & Explanation:**

Philippine disability statistics: PSA 2010 CENSUS: 1.57% of the Philippine population reported having a disability — approximately 1.57 million persons. TYPES: visual impairment (most common), intellectual disability, psychosocial disability, physical disability, hearing impairment. UNDERESTIMATION LIKELY: cultural reluctance to report disability; definitional limitations of census questions; chronic disease-related functional limitations not captured. WORLD HEALTH ORGANIZATION ESTIMATE: approximately 15% of the global population has some form of disability (WHO World Report on Disability, 2011) — Philippine 1.57% likely significantly underestimates true prevalence. PT RELEVANCE: understanding disability prevalence guides: workforce planning (how many PTs are needed); advocacy for rehabilitation services; CBR program design; PhilHealth coverage priorities. The gap between Philippine reported disability (1.57%) and WHO global estimate (15%) highlights the massive UNMET NEED for rehabilitation services in the Philippines.

ETHICS

300. The 'professional will' (professional end-of-practice planning) in PT ethics addresses:

A. Only financial planning

B. The PT's RESPONSIBILITY TO PLAN FOR PRACTICE CONTINUITY IN CASE OF UNEXPECTED INCAPACITY OR DEATH — including designating who will notify patients, ensuring records are properly transferred, arranging for another PT to take over ongoing patient care, and protecting patient confidentiality during the transition; failure to plan can ABANDON PATIENTS at vulnerable times

C. Only retirement planning

D. Only hospital employment contracts

✓ Answer: B

💡 **Rationale & Explanation:**

PT professional will and practice continuity: ALL LICENSED PTs, whether employed or self-employed, should have a plan for: 1) PATIENT NOTIFICATION: who will contact current patients if the PT is suddenly incapacitated (accident, severe illness, death); 2) RECORD MANAGEMENT: who has access to patient records; how records will be transferred to other providers; how confidentiality will be protected; records must be retained per DOH/PRC guidelines even after the PT leaves practice; 3) COLLEAGUE COVERAGE: arrangements with a colleague PT to provide emergency coverage; 4) FINANCIAL RESPONSIBILITIES: billing, insurance claims for services already rendered; 5) DOCUMENTATION: a letter to patients explaining the situation and providing alternative PT referrals. FOR EMPLOYED PTs: institutions have procedures — but the PT should understand them and contribute to transition planning when leaving employment. FOR SELF-EMPLOYED PTs: personal responsibility to create a written plan, designate an executor, and store the plan where it can be found.

QUICK REFERENCE NOTES

MRC Muscle Testing Scale: 0=None, 1=Trace, 2=Gravity eliminated, 3=Against gravity, 4=Some resistance, 5=Full resistance

ASIA Impairment Scale: A=Complete, B=Sensory incomplete, C=Motor <3/5 majority, D=Motor ≥3/5 majority, E=Normal

Brunnstrom Stages: 1=Flaccid, 2=Spasticity begins, 3=Synergy peak, 4=Some out of synergy, 5=More selective, 6=Near normal, 7=Normal

Maitland Grades: I=Small/start range (pain), II=Large/mid range (pain), III=Large/end range (stiffness), IV=Small/end range (stiffness), V=HVLAT

Wound Healing Phases: Hemostasis (0-3d) → Inflammation (1-6d) → Proliferation (4-21d) → Remodeling (21d–2yr)

Key Dermatomes: C6=thumb, C7=middle finger, C8=little finger, T4=nipples, T10=umbilicus, L4=medial foot, S1=lateral foot

Key Reflexes: Biceps=C5-C6, Triceps=C7, Patellar=L3-L4, Achilles=S1-S2

Spinal Cord Levels (SCI): C4=diaphragm (C3-C4-C5), C6=tenodesis, C7=triceps, T6=autonomic dysreflexia threshold, L2-L4=quads

Normal Vitals in PT: HR: 60-100bpm, BP: <120/<80, SpO2: 95-100%, RR: 12-20/min

Berg Balance Scale: 0-20=High fall risk, 21-40=Moderate risk, 41-56=Low fall risk

WOMAC: Outcome measure for hip/knee OA and arthroplasty (Pain, Stiffness, Function)

US Parameters: 1 MHz=deep (2-5cm), 3 MHz=superficial (0.5-2cm). Continuous=thermal, Pulsed=non-thermal

TENS Modes: Conventional (80-150Hz, low intensity)=Gate control/fast pain relief. Acupuncture (1-4Hz, high intensity)=Endorphins/prolonged

relief

PRC PT Law: RA 10210 (2012) = Philippine Physical Therapy Act. 45 CPE units/3 years for license renewal

Evidence Hierarchy: Meta-analysis/Systematic review > RCT > Cohort > Case-control > Case series > Expert opinion

SMART Goals: Specific, Measurable, Achievable, Relevant, Time-bound

SOAP Notes: Subjective, Objective, Assessment, Plan

FITT Principle: Frequency, Intensity, Time, Type — for exercise prescription

Key PNF Techniques: Hold-Relax=autogenic inhibition (GTO). Contract-Relax=isotonic. CRAC=most effective (reciprocal + autogenic inhibition)

Gait Phases: Stance 60% (heel strike→loading→midstance→terminal stance→preswing), Swing 40% (initial→mid→terminal swing)

— End of Reviewer —

Good luck on your board examination. You've got this! 💪